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# **FUNDS AND GAMES**

## **THE ECONOMICS OF EUROPEAN COHESION POLICY**

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## CONTENTS

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Executive Summary .....	1
Chapter 1. Cohesion Policy in the EU.....	4
1.1. The rationale .....	4
1.2. The institutional design.....	5
1.3. The practice .....	6
1.4. Conclusions .....	11
Chapter 2. Regional Convergence in the EU .....	12
2.1. Theoretical issues on convergence .....	12
2.2. Empirical evidence on convergence in Europe.....	14
2.3. Conclusions .....	21
Chapter 3. The impact of cohesion policy on convergence.....	23
3.1. Cohesion policy and convergence .....	23
3.2. A history of evaluation .....	24
3.3. Case studies .....	25
3.4. Model simulations .....	27
3.5. Econometric studies.....	29
3.6. Conclusions .....	31
Chapter 4. New Evidence on Cohesion Policy and Convergence.....	33
4.1. National convergence and cohesion policy .....	33
4.2. Regional convergence and cohesion support.....	35
4.3. Crowding out .....	37
4.4. Conclusions .....	41
Chapter 5. A Synthesis of Empirical Findings.....	42
5.1. The impact elasticity of cohesion support .....	42
5.2. The sample.....	42
5.3. A meta-analysis .....	44
5.4. Conclusions .....	46
Chapter 6. The Future of Cohesion Policy .....	47
6.1. Cohesion policy in light of enlargement.....	47
6.2. Dilemmas in reforming cohesion policy.....	51
6.3. Options for reform in light of enlargement.....	55
6.4. Conclusions .....	58
Chapter 7. Conclusions .....	60
References .....	62
Annex I. The old set of six objectives .....	68
Annex II. A theoretical foundation for the growth-initial level regression equation .....	69
Explanation of Abbreviations.....	75

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#### **Executive Summary**

How effective is European cohesion policy in reducing regional welfare differences? Can the political game concerning the distribution of funds be consistent with an effective policy? And how should it be reformed if a number of Central and Eastern European Countries (CEECs) accede to the EU?

Cohesion support comprises the Structural Funds and the Cohesion Fund. After the Common Agricultural Policy it is the second largest item on the EU-budget: between 2000 and 2006, more than €200 billion will be allocated to regions and member states that lag behind in development, have industries in decline or face high unemployment. This amounts to more than 40% of the EU budget. It makes the distribution of funds subject to vigorous negotiations, which will only gain importance with the upcoming enlargement of the EU by twelve relatively poor new member states.

Though the goal of cohesion policy lacks precision in official documents, it is to be interpreted as a way to reduce the welfare differences among European regions. Views differ as to whether cohesion policy is successful. On the one hand, the view of the European Commission is positive: in its Second Report on Economic and Social Cohesion it praises the effectiveness of current cohesion policies (EC, 2001b). On the other hand, some commentators take a more pessimistic view. Boldrin and Canova (2001) for example, claim that cohesion policy is ineffective because it is primarily motivated by political considerations other than the reduction of welfare differences.

This study contributes to the discussion on the effectiveness of cohesion policy in two ways. First, it comprehensively reviews case studies, simulation models and econometric estimates, something that has not been done previously with the same degree of thoroughness. From this review, we conclude that there is certainly scope for improvement in the effectiveness of cohesion policy. Second, the study makes use of the best-available data sources on cohesion policy<sup>1</sup> to assess its impact upon redistribution and growth. This contributes to the relatively meagre body of econometric evidence. The results confirm some degree of redistributive efficiency: poor regions get more than rich regions. The extent to which cohesion support affects convergence remains, however, unclear. Some econometric analyses suggest that the funds have a negligible or even a negative impact on convergence, while others imply a significant positive impact. The study also makes use of a unique data set on national regional policy to estimate the extent of crowding out, i.e. the adverse impact of European funds on

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\* Central Planning Bureau (CPB Netherlands' Bureau for Economic Policy Analysis), The Hague. The authors wish to thank Angel de la Fuente for helpful discussions during his visit to CPB, and are grateful to Rafael Doménech and Reiner Martin for providing data on which much of the econometric analysis is based. They also benefited from contributions by Henri de Groot and Sjak Smulders, as well as from comments on earlier drafts by Liam Aspin, Roel Beetsma, Marcel Canoy, Paul Tang, Bart Verspagen, and participants of the CPB workshop on EU cohesion policy. This paper originally appeared as a CPB publication in April 2002.

<sup>1</sup> A comprehensive database is unavailable; therefore, information from different sources had to be combined.

national regional support. This turns out to be an important phenomenon. How can cohesion policy be made more effective? The study considers various dilemmas that policy-makers face when thinking about cohesion policy reform. It also elaborates on how these dilemmas will change with the enlargement of the EU, and puts forward a number of directions for reform.

### **Main findings**

Chapter 1 summarises cohesion policy. Under this header, the EC finances projects that help lagging regions catch up with the rest of Europe. The most important fund is the European Regional Development Fund (ERDF), which finances infrastructure, employment projects and small-scale business. The data are in accordance with the EC's focus on convergence: the poorer a region, the more support it tends to get. Nevertheless, rich regions also receive cohesion support. This obviously reduces the redistributive efficiency of cohesion policy.

An intricate interaction between the EC, the member states and the regional authorities characterises the actual distribution of the funds. The approach is top-down: first the budgets for the separate member states are negotiated, then the money goes to the regions and only then are the details of the individual projects determined. The process is constrained by EC guidelines. These pre-empt arbitrariness in distribution, and help to achieve uniformity in monitoring and evaluation of individual projects. The downside is that they create bureaucracy. This will be particularly important for the Central and Eastern European Countries once they accede to the EU. Indeed, these countries will probably lack the administrative capacity to draw down the funds to which they are entitled.

Chapter 2 deals with convergence. Some economic growth theories predict that there is 'natural' convergence: economies tend to grow closer together in terms of GDP per capita. One reason is that investment in poorer, capital-scarce regions has a higher return due to decreasing returns to scale. Another reason is that poorer regions are relatively successful in adopting new technologies because of the technology gap between them and other regions. Either explanation is of course qualified in numerous ways. Furthermore, agglomeration benefits constitute a divergent force, driving poorer, more sparsely populated regions and richer, more densely populated regions apart.

The evidence favours convergence: the GDP per capita of poorer regions tends to grow faster than that of richer regions. This conclusion is robust to the level of aggregation. It remains true for the fifteen member states as well as for the hundreds of regions, roughly the size of a Dutch province or a German Regierungsbezirk. Moreover, contrary to popular belief, the data also support convergence within member states. The exception is Italy, where the relatively poor regions in the Mezzogiorno on average grow more slowly than the richer northern regions.

It remains to be seen whether part of the observed convergence is attributable to cohesion policy, and if so, how big that part is. Chapter 3 reviews the existing literature, consisting of three different types of research: case studies of individual projects or small groups of projects, simulations of the macro-economic impact of cohesion policy with large computable general equilibrium models and econometric analyses. No consistent picture of the impact of cohesion emerges from either type of research. The estimates range from a counterproductive divergent impact to internal rates of return for individual projects of more than 1500%. It does appear, however, that model simulations tend to yield more positive conclusions than econometric analyses or case studies do.

Econometric analyses are relatively scarce, mainly due to a lack of reliable data at the regional level. Chapter 4 adds to the small number of pre-existing analyses. Its conclusions are mixed: cohesion support only fosters economic growth in lagging member states if their economies are open. A possible explanation for this finding is that openness disciplines governments and that disciplined governments are essential for the efficient spending of cohesion support. At the

regional level, the estimates differ between specifications. At one extreme, if one presupposes that each region grows towards its own country-specific long-run equilibrium of GDP per capita (so that differences will persist), then the impact is positive. At the other extreme, if one presupposes that regions will converge to the same long-run equilibrium GDP per capita (so that differences will disappear in the long run) then the impact is negative. This implies that the more negative one is about convergence, the more effective cohesion policy appears to be and vice versa.

Chapter 4 also presents an estimate of crowding out of national regional aid. This is often blamed for the alleged lack of effectiveness of cohesion policy, though to date there have been no empirical estimates of the degree of crowding out. The analysis shows that, on average every €1 of cohesion support crowds out €0.17 of national regional aid. This is in spite of the EC's requirement that projects are co-financed by the member states.

Chapter 5 presents a meta-analysis of both the literature reviewed in Chapter 3 and the new evidence presented in Chapter 4. An 'impact elasticity', defined as the additional economic growth per unit of cohesion support, is calculated whenever possible. The elasticities of model simulations turn out to be significantly higher than those of econometric studies. This does not necessarily mean that either type of research is wrong. Rather, the model simulations typically presuppose that cohesion support directly translates into productive public capital, whereas econometric studies implicitly take into account crowding out, rent-seeking and other phenomena that may thwart the effectiveness of cohesion policy. This implies that the findings of model simulations are to be interpreted as the potential impact and the findings of econometric studies as the actual impact. The existing body of literature suggests that there is a significant gap between the two. Bridging this gap constitutes a challenge for the coming reform of cohesion policy.

Chapter 6 takes up the gauntlet by discussing directions for reform that aim at increasing effectiveness. Various dilemmas and political constraints complicate the feasible set of options for reform. Moreover, EU enlargement may change these dilemmas and constraints. Three options remain. The first reduces inefficiencies by tighter monitoring and control by the EC. This has been the EC's typical response to past problems. The second option is to move towards a system in which local governments compete for funds on the basis of project proposals. The amount of support by the EU for a project could be made dependent on national welfare so as to concentrate support on poorer countries. A final option entails a system of fiscal transfers, possibly accompanied by general conditions on good governance by the receiving country. Increasing the impact of cohesion policy paves the way for more ambitious goals with fewer funds. This would ease the political tensions that dominate current discussions on cohesion policy reform.

## CHAPTER 1

### COHESION POLICY IN THE EU

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The EU attempts to reduce differences in welfare between regions. It does so by funding programs in regions that lag behind in production per capita, over-rely on industries in decline, or face high unemployment. These programs intend to enhance infrastructure, restructure industries or modernise education. The policy has come to be known as ‘cohesion policy’. At present it involves the redistribution of €213 billion over a six-year period, which amounts to approximately one-third of the EU budget. This Chapter reviews the basics of cohesion policy: its rationale, its design and its practice.

#### 1.1. The rationale

The Treaty of Amsterdam states that the European heads of state ‘resolved to achieve the strengthening and convergence of their economies’ (European Union, 1997, p. 149). The EC translates this into a continuation of its cohesion policy. The Treaty also provides clues about the whys and the wherefores: it mentions ‘solidarity’ and ‘reinforced cohesion’ (European Union, 1997, p. 149). This is underlined by the European Commission (EC): it states that it aims ‘to support those actions that are most likely to contribute to the reduction of the economic, social and territorial disparities in the Union’ (EC, 2001a).

Slogans like ‘strengthening and convergence of economies’, ‘solidarity’ and ‘cohesion’ are somewhat opaque. From the way the funds are distributed, it can be induced that the prime goal of cohesion policy is probably the reduction of differences between regional GDP per capita, and to a lesser extent, the reduction of differences between regional rates of unemployment. The EC often decides on how cohesion support is to be spent. This suggests that equity is not the sole motivation for cohesion policy, since a mere fiscal transfer from rich to poor would otherwise suffice (Nahuis and De Mooij, 2001). What are the other motivations?

The concept of subsidiarity can shed some light on this issue. At first sight the EC’s direct interference appears to be at odds with the principle that intervention is desirable only if it yields a better outcome than decentralized decision making. The latter may fail in the presence of externalities, risk and moral hazard. If one can show that either of these problems prevail, then cohesion policy in its present form could be justified.

Cross border externalities, where a governments’ regional policy has a marked impact on the welfare of foreign regions, pertain to infrastructure projects in border regions. The EC recognises this, as it has taken initiatives to finance precisely this type of investment. The vast majority of cohesion policy has, however, another focus. Externalities therefore cannot justify cohesion policy that goes beyond fiscal transfers.

Risk and moral hazard may justify Community intervention. Cohesion support can be seen as an insurance device against the internal market causing unexpected disproportional needs for restructuring in certain regions. Furthermore, member states may, in the absence of intervention, willingly fail to develop the poorer regions on their own account in order to ensure a continuous stream of support from Brussels. It should be noted, however, that none of the EU documents mention risk and moral hazard as reasons for the present design of cohesion policy.

The purpose of cohesion policy does meet criticism. Boldrin and Canova (2001) argue, for example, that it implies a ‘schizophrenic’ position of the EC on labour mobility. According to the EC, European integration promotes competition and efficiency and, via agglomeration effects, this leads to divergence between regional income per capita. This would not be a problem if labour was free to move from poor to rich regions. By allocating cohesion support to poor regions however, the EC reveals that it either accepts that labour is immobile, or believes that labour should be immobile. This is of course inconsistent with the ‘four freedoms’ – freedom of movement of labour, capital, goods, and services – which constitutes the essence of

the Single Market. Moreover, cohesion policy sits uneasily with growth theories that say that factor mobility drives convergence, as well as with the observation that rapid convergence tends to coincide with high labour mobility.

## **1.2. The institutional design**

The present institutional design of cohesion policy dates back to 1999. In that year the European Council of Berlin agreed upon ‘Agenda 2000’, a reform of a number of important EU policies. Four ‘Structural Funds’ were re-established. They are:

- The European Regional Development Fund (ERDF). It primarily finances investment in infrastructure and employment, but also initiatives of small-scale businesses;
- The European Social Fund (ESF). It supports programs that aid the integration of the unemployed or otherwise disadvantaged groups in the labour market.
- The Guidance Section of the European Agricultural Guidance and Guarantee Fund (EAGGF). It supports farmers and finances programs for the development of rural areas;
- The Financial Instruments for Fisheries Guidance (FIFG). It aims at restructuring and modernising the fishing fleet.

In addition, a separate ‘Cohesion Fund’ was consolidated. It finances environmental and transport projects in Greece, Ireland, Portugal and Spain in order to enable these poorer member states to participate in the economic and monetary union without undermining these types of public investment. Finally, the Poland Hungary Action for the Reconstruction of the Economy (PHARE) was supplemented by the Special Accession Program for Agriculture and Rural Development (SAPARD) and the Instrument for Structural Policies for Pre-accession (ISPA). These Funds support the accession countries in adopting the *acquis communautaire* – the body of EU rules – in preparing for the Common Agricultural Policy, in investing in infrastructure, industry and social affairs and in financing environmental and transport projects.

The bulk of the four Structural Funds is allocated according to three ‘Objectives’<sup>2</sup>:

- Objective 1 is to help lagging regions catch up with the rest of Europe by providing basic infrastructure and encouraging business activity. Regions with a GDP per capita of less than 75% of the Community average qualify for this type of funding.
- Objective 2 is to help the economic and social restructuring of regions dependent on industries in decline, agriculture, fishery or areas suffering from problems specific to urbanisation. Eligibility for Objective 2 funding is complex. In order to qualify industrial regions must have an unemployment rate above the Community average, a higher percentage of jobs in the industrial sector than the Community average, and a decline in industrial employment. For rural or other types of regions similar sets of requirements apply. Moreover, regions must not be eligible for Objective 1 support.<sup>3</sup>
- Objective 3 is to modernise education and increase employment. This type of funding is Community wide. Any region may qualify, provided that it does not receive Objective 1 funding.

Most of the remainder of the Structural Funds goes to the Community Initiatives (CI) INTERREG III, URBAN II, LEADER+ and EQUAL. These are programmes initiated by the

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<sup>2</sup> The three present Objectives replace six previous Objectives. For an explanation of the old institutional design of cohesion policy see Annex 1 of this document.

<sup>3</sup> For a detailed description of Objective 2 eligibility, see Council Regulation No. 1265/1999.

EC to promote interregional cooperation in solving common problems. INTERREG III supports cross border initiatives, URBAN II innovative strategies for the redevelopment of urban areas, LEADER+ attempts to bring together parties in rural areas in order to achieve sustainable development and EQUAL tries to remove inequality and discrimination on the labour market.

A small part of the Structural Funds does not fall under either the three Objectives or the CI. A proportion of the FIFG gives special support to projects that, among other things, preempt over-fishing. The ERDF also finances innovative actions to improve strategies for research and development. Moreover, the allocation of the Cohesion Fund, the PHARE, the SAPARD and the ISPA follows its own rules. In particular, the Cohesion Fund goes to member states with a gross national product (GNP) per capita of less than 90% of the Community average (Council Regulation No. 1265/1999). These are Greece, Ireland, Portugal and Spain. Ireland however, has experienced a rapid economic development over the last decade, and will leave the group of cohesion countries. The allocation of the PHARE, SAPARD and ISPA mainly depends on the negotiations between the EU and the candidate member states. These funds however, are relatively small, and bear little relation to the present process of convergence between regions in the EU. They are therefore relegated to Chapter 6, where they will be discussed in light of the EU enlargement.

The complexity of cohesion policy partly stems from the coexistence of several funds. Some are allocated according to several objectives and Community initiatives, others according to their own set of rules. In addition, some funds benefit regions, others member states and yet others particular sets of projects across the entire EU. The thrust of cohesion policy is, however, largely determined by ERDF support for Objective 1 programs, as this type of funding is by far the most important in budgetary terms. Since Objective 1 support goes to regions with a GDP per capita of less than 75% of the EU average, it seems that cohesion policy should be redistributive.

In this light, Objective 2 and Objective 3 support are questionable. In particular, these objectives distribute funds to relatively rich regions. This mitigates redistribution and is, therefore, inconsistent with the aim to reduce differences between regional GDP per capita. The next section assesses to what extent the total of cohesion support is indeed redistributive.

### **1.3. The practice**

The practice of cohesion policy entails an intricate interaction between, on the one hand, the regional and national authorities, and on the other, the EC. First, the EC proposes a budget and a set of rules for cohesion policy for the next 'planning period' of six years. Second, the Council of Ministers and the European Parliament must approve the policy. If they do, the budget is distributed over the member states, where the EC, in close consultation with the member states, determines which regions may use which funds on the grounds of which objectives.

Each member state or region then offers proposed projects to one another in 'plans'. All this must be in accordance with the funds and objectives that apply to the member state or region in question. These plans are discussed with the EC, which, if it approves, advances part of the granted funds. Only then, are the details of the projects themselves fleshed out. Thus, the approach is top down: first the budget is determined, then it is distributed over the regions and finally, the precise projects are selected.

The evaluation of the projects is largely in the hands of the regional authorities. In the early days of cohesion policy this evaluation was rather ad hoc, and resulted in a plethora of case studies of different method and content. Nowadays, the member state or region is subject to rather strict guidelines from the EC. These have certainly led to more structure in cohesion policy. Nevertheless, they are sometimes criticised for having caused bureaucracy. In this light the 'absorption capacity' is noteworthy. The authorities of some of the lesser-developed member



states or regions may lack the skills or the resources to deal with the complicated requirements of cohesion policy; thus, they are unable to claim the funds to which in principle they are entitled to. This appears to be a pressing problem for the accession countries. They do not manage to spend more than 20% of the pre-accession support (Ministerie van Buitenlandse Zaken, 2002). Deregulation, therefore, appears to be important in order to ensure that cohesion policy continues to benefit the poorest regions. Chapter 6 will come back to this issue.

The introduction to this Chapter has already mentioned that cohesion policy is of outstanding importance for the EU. It adds up to €213 billion over the present period, running from 2000-06. To put this into perspective: the annual expenditure of €35.5 billion amounts to 40% of the total EU budget, and 0.35% of EU GDP. Table 1.1 shows how these means are distributed over the three Objectives, CI, and other purposes.

Table 1.1. Allocation of cohesion support 2000-06

	Billion of euro	% of total resources
Structural Funds	195	91.5
Objective 1	136.0	63.8
Objective 2	22.5	10.6
Objective 3	24.1	11.3
Community Initiatives	10.4	4.9
Other	2.1	1.0
Cohesion Fund	18	8.5
Total	213	100

Source: EC (2001a).

The prime goal of cohesion policy is convergence of regional productivity per capita. Only if funds distributed from rich to poor does cohesion policy have the potential to help lagging regions catch up, but to what extent does it actually redistribute?

#### Distribution over member states

Indeed, the bulk of cohesion support does go to poorer regions and poorer member states. Recall that the funds allocated to Objective 1 are earmarked for regions with a GDP per capita of less than 75% of the EU average, while the Cohesion Fund goes to member states with a GNP of 90% of the EU average. Table 1.1 shows that these funds add up to €154 billion, no less than 72% of total resources. Since the poorest regions tend to lie in the poorest member states, one expects that redistribution materialises at both the level of the regions and of the member states.

Table 1.2 shows the distribution of the total resources over the over the 15 member states for the present period 2000-06. Note that each member state receives at least some support. Poor member states receive, however, substantially more: support per capita is more than €1000 in Greece, Ireland, Portugal and Spain, and less than €200 in Denmark, the Netherlands, Austria, Belgium and Luxembourg. Luxembourg and Denmark miss out on Objective 1 support because these countries have no lagging regions. Greece, Ireland and Portugal do not get Objective 2 and 3 support because all their regions qualify for Objective 1.

A regression yields a more precise picture of the extent to which cohesion policy is redistributive. Figure 1.1 displays the relationship between the log of GDP per capita (in purchasing power parities (PPP) in order to control for differences in cost of living) and the log of the total amount of support per capita. The slope of the regression line is -3. This means that a 1% increase in GDP per capita implies a 3% reduction in cohesion support per capita.

Figure 1.1. Income redistribution at a national level

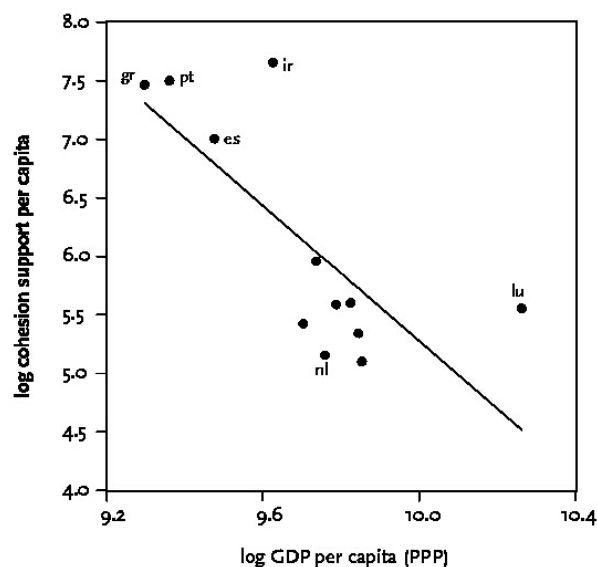


Table 1.2. Allocation of Structural Funds over receiving countries, 2000-06

	Objective 1	Objective 2	Objective 3	Total	Per capita <sup>c</sup>
	€ billion				€
Belgium	625	433	737	1795	180
Denmark	0	183	365	548	141
Germany	19958	3510	4581	28049	343
Greece	20961	0	0	20961	1973
Spain	38096	2651	2140	42887	1087
France	3805	6050	4540	14395	248
Ireland <sup>a</sup>	3088	0	0	3088	833
Italy	22122	2522	3744	28388	497
Luxembourg	0	40	38	78	183
Netherlands	123	795	1686	2604	167
Austria	261	680	528	1469	180
Portugal	19029	0	0	19029	1927
Finland	913	489	403	1805	355
Sweden <sup>b</sup>	722	406	720	1848	215
United Kingdom <sup>a</sup>	6251	4695	4568	15514	266
EU-15	135954	22454	24050	182458	490

<sup>a</sup> Includes the PEACE (2000-04) programme.

<sup>b</sup> Including special programme for Swedish coastal areas.

<sup>c</sup> Includes support under Financial Instruments for Fisheries Guidance.

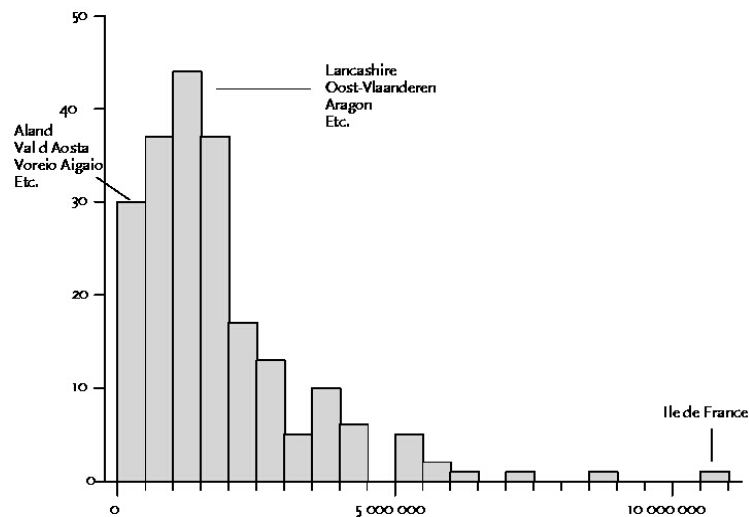
Source: [http://europa.eu.int/comm/regional\\_policy/ag2000/finan\\_nl.htm](http://europa.eu.int/comm/regional_policy/ag2000/finan_nl.htm).

### Distribution over regions

Is cohesion policy also redistributive at the regional level, and if so, to what extent? This Section attempts to answer these questions at the 'provincial' NUTS II level.<sup>4</sup> A choice for this level of disaggregation makes sense since eligibility for the important Objective 1 support is defined at this level of aggregation.

NUTS II regions differ considerably, both in terms of population and in terms of GDP per capita. Figure 1.2 shows the population distribution. The modus has 44 regions with approximately 1.25 million inhabitants. Examples of such regions are Lancashire, Oost-Vlaanderen and Aragon. On the one end, there is the Finnish island of Åland with a mere 25,000 inhabitants, and on the other, the Isle de France with a population of more than 10 million.

Figure 1.2. Distribution of population Figures in NUTS II regions, 1996



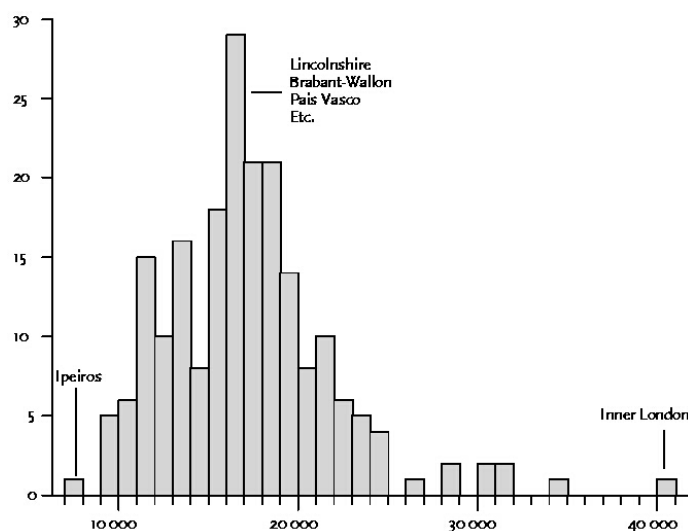
Source: EUROSTAT regional statistics.

Figure 1.3 shows the distribution of the GDP per capita (for 1996 and on the basis of PPP<sup>5</sup>). It reveals that there are 29 out of the 210 NUTS II regions in the modus of a GDP per capita of approximately €16,500. Examples of these 'typical' regions are Lincolnshire, Brabant-Wallon and the País Vasco. At the poor end, one finds the Greek region Ipeiros, with a GDP per capita of less than €8000, at rich end Inner London with a GDP per capita of more than €40,000.

<sup>4</sup> EUROSTAT, the EU statistical office, decomposes the Union into four sets of regions: the first set comprises the 15 individual Member states; the second set comprises large parts of member states such as Oost-Nederland or Bayern (78 regions); the third set comprises somewhat smaller administrative unit such as Dutch provinces or German 'Regierungsbezirke' (210 regions); and the fourth and finest set comprises agglomerations and their surrounding countryside such as Arnhem-Nijmegen or München (1093 regions). These four sets are labelled respectively as NUTS 0, NUTS I, NUTS II, and NUTS III, where NUTS stands for *nomenclature des unité territoriales statistiques*. In some cases, one and the same region pertains to NUTS 0, NUTS I and NUTS II. Most regions however, do obey the classification sketched above.

<sup>5</sup> PPPs are only available at the national level; therefore, intra-country differences between costs of living are ignored. Since prices and incomes are typically positively correlated, Figure 1.3 probably overstates the income inequality between the European regions.

Figure 1.3 Distribution of GDP per capita in NUTS II regions, 1996



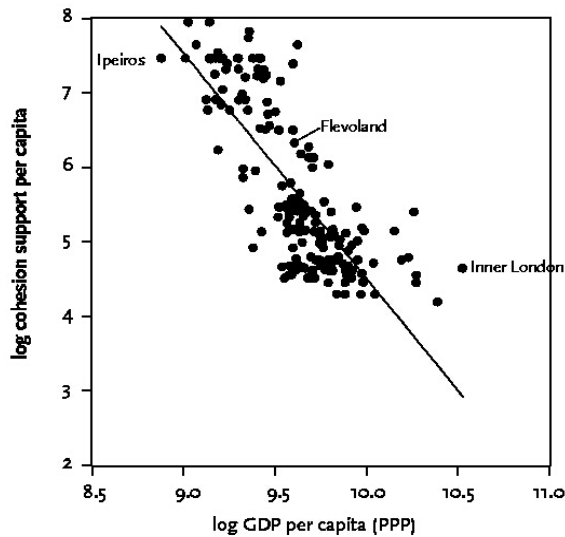
Source: EUROSTAT regional statistics.

What remains to be done is to regress cohesion support on GDP per capita. Unfortunately, the distribution of total cohesion support is not readily available at the NUTS II level. The reason is that some projects – such as the ones under the Cohesion Fund – are booked under a national header. In calculating the amount of total cohesion support per NUTS II region, one must therefore make certain assumptions. Here it is assumed that the non-regional funds (predominantly the funds allocated to Objective 3, the Cohesion Fund and the funds under Objective 1 and 2 not yet distributed to separate regions) are allocated to individual regions in proportion to population. In doing so, the institutional design of cohesion policy is taken into account, in particular that Objective 1 regions are not eligible for Objective 2 and 3 and vice versa. For 183 out of 210 NUTS II regions, it proved possible to obtain a reasonable estimate of total cohesion support. The regression is based on this set of data.

Figure 1.4 displays the relation between the log of cohesion support per capita and the log of the GDP per capita. The slope of the regression line is -3. This means that a 1% increase in GDP per capita implies a 3% reduction in cohesion support per capita. Recall that this is similar to what was obtained for member states. Thus, the estimate of the redistributive impact of cohesion policy is robust to changes in the level of aggregation.

The prime purpose of cohesion policy is to reduce differences in welfare between regions. The simple regression above shows that a necessary condition for cohesion policy to be effective in achieving this purpose is satisfied: it redistributes. A note on the appropriateness of using GDP per capita as a measure of welfare is however in place. First, a quality of life index, including education, health, intra-regional income variation and environmental quality appears to be superior. Second, GDP per capita does not take account of the price variation within countries. Third, it may be biased due to interregional imbalances in commuting. Unfortunately, EUROSTAT does not provide the necessary data for taking these complications into account. GDP per capita remains the best available measure. Moreover, it determines both the allocation of the funds under Objective 1 as well as the cohesion fund. This warrants the use of this measure.

Figure 1.4. Income redistribution at a regional level



Although poor regions receive relatively much support, rich regions still receive some. This mitigates the redistributive impact of cohesion policy. One reason is that some cohesion support is not ‘territorial’ but ‘thematic’, which implies that the funding is not necessarily allocated to the poorest regions. There are two other reasons. First, all regions appear to be successful in drawing down at least some funds in the inevitable political bargaining that the distribution entails. Second, there is inertia: a region that has received funds in the past is more likely to receive funds in the future. The EC has in fact institutionalised the inertia by different ‘phasing-out’ arrangements.

#### 1.4. Conclusions

Cohesion policy attempts to reduce differences in welfare between regions. No less than one-third of the EU budget is spent on a wide range of programmes that primarily aim to develop infrastructure, restructure industries or modernise education. The EC not only distributes the funds, but also is directly involved in how the funds should be spent. It remains, however, unclear as to why the EC does not confine itself to mere fiscal transfers since that appears to be consistent with the principle of subsidiarity.

The data show that cohesion policy fulfils a necessary condition for its effectiveness: poor regions tend to receive more support than rich regions; nevertheless, each member state, however affluent, succeeds in drawing at least some funds to its regions. This mitigates the redistributive impact of cohesion policy. Chapters 3, 4 and 5 address whether cohesion policy in fact fosters convergence. Before that, the next chapter maps convergence per se. It discusses the degree in which regions and member states tend to grow towards each other in terms of GDP per capita, regardless of the distribution of cohesion support.

## CHAPTER 2

### REGIONAL CONVERGENCE IN THE EU

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The prime goal of cohesion policy is convergence of regional income per capita. But what is meant by convergence? How is it measured? And did European regions experience convergence in the past decades? This Chapter explores these issues. In particular, after discussing the main strands of economic theory on convergence, it elaborates on the empirical analysis of convergence in Europe.

#### 2.1. Theoretical issues on convergence

Economic growth has been attracting a lot of attention among economists during the last decades. An important aspect in the literature is to understand the forces behind the process of economic growth. A related topic is convergence, which can be seen as the tendency towards the reduction of income disparities. This Section discusses the main strands of the theoretic literature on growth and convergence. It considers the literatures on, respectively, neo-classical growth, endogenous growth, technology-gap and economic geography.

##### Neo-classical growth theory

The most influential view on economic growth today is given by the neo-classical growth theory, based on the seminal work of Robert Solow (1956). The basic Solow model is built around two equations: a production function and a capital accumulation function. Technological progress is exogenous in this model. An important notion in the Solow model is the concept of steady state. In the steady state, the amount of investment undertaken is exactly equal to the amount of investment needed to keep the capital-technology ratio constant. The economy then is in equilibrium and output per worker grows at a constant rate: the rate of technological progress. In the steady state, the growth rate of per capita income is therefore completely determined by technology.

Economies are not always in their steady state. In the neo-classical perspective, however, an economy will eventually converge to its steady state due to diminishing returns of capital. In other words, as long as capital is relatively scarce, it is easy to think of profitable investments that temporarily stimulate growth above the steady state growth level. The further an economy is below its steady state therefore, the faster it will grow.

Still, not all economies will converge to the same level of per capita income. This is because of differences in investment rates and population growth. The neo-classical theory predicts that the higher the investment rate in both human and physical capital and the lower population growth, the higher the steady state level of per capita income will be. In the Solow model, a policy change can therefore have effects on the steady state level via its influence on investment rates, but it can only temporarily increase growth rates along the transition to the new steady state.

As long as economies are similar in terms of technology levels, investment and population growth rates, they will converge to the same steady state. Differences in per capita income can temporarily exist, but the poor, capital scarce regions tend to catch up with richer ones. Indeed, the neo-classical model predicts convergence of welfare among countries with similar economies.

##### Endogenous growth theory

Although the neo-classical growth theory highlights technological progress as the engine of economic growth, it assumes that technology is like ‘manna from heaven’: it descends upon the economy automatically, regardless of the state of affairs in the economy. The endogenous or new growth theory seeks to explain the economic forces that drive technological progress. One of the pioneers of this idea is Romer (1986). An important characteristic of most endogenous

growth models is that the return to capital does not fall with the amount of capital; instead, investments remain sufficiently profitable to warrant a continuous growth in the capital stock. This is because capital may be interpreted more broadly, e.g. including human (Lucas, 1988), public (Barro, 1990) and technology capital (Grossman and Helpman, 1991).

In the endogenous growth theory, differences in long-term economic growth can be explained by differences in the efforts to generate or adapt knowledge on new technologies. It is therefore important as to whether the accumulation of knowledge is subject to the law of diminishing returns. If the cost of additional innovations falls with scientific experience, the return on technological investment increases with the stock of accumulated knowledge. Rich countries at the technological forefront may therefore find it easier to think of new ideas and increase their lead. Hence, technology may be an important source for divergence.<sup>6</sup>

To summarise, in the new growth theory technology makes technology – and this usually means money makes money. So, a poor economy will stay poor, because it simply lacks the ability to invent and adapt new technologies. By contrast, rich economies innovate all the time and grow richer and richer.

### **Technology gap literature**

Whereas the endogenous growth theory predicts that technological progress causes divergence between economies, the technology gap literature (Fagerberg, 1987) points in the opposite direction. Indeed, the public good properties of technical knowledge can have an international dimension that favours less advanced countries. The basic idea is very simple: followers can imitate the inventions of the technological leader, without having to reinvent the wheel. Thus, provided they have the capability to absorb and adapt foreign technology, poor countries can exploit the knowledge obtained in richer countries to catch up. From this perspective, technological backwardness leaves scope for successful imitation, thereby leading to convergence. Although the mechanism is different, the resulting predictions about economic growth are very similar to the neo-classical theory.

### **Economic geography literature**

In the past decade, the theory of economic agglomeration received renewed interest. This is mainly due to Krugman (1991), who developed an analytic framework to study how gains from agglomeration interact with other forces that shape economic geography. This so-called ‘new economic geography’ school shows that agglomeration forces can lead to different types of equilibria.<sup>7</sup>

Braunerhjelm et al. (2000), illustrate the interaction of these agglomeration forces and competitive pressures by sketching three different scenarios for the future economic geography of Europe. First, a balanced regional development will result if most regions are able to exploit their local comparative advantages. If, however, the gains from agglomeration are very strong, one can expect substantial geographic concentration. Together with high labour mobility, this second scenario would leave some regions largely unpopulated, but per capita incomes would converge. In a third scenario with low mobility of labour, there will be polarisation into

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<sup>6</sup> Note however, that this strand of literature is quite broad and contains more or less all contributions that try to endogenise technological progress. With another assumption about accumulation of knowledge, the new growth theory can therefore predict convergence as well. Nevertheless, endogenous growth theory is normally associated with the prediction of divergence (see e.g. Sala-i-Martin (1996)). This convention is followed here.

<sup>7</sup> A comprehensive overview can be found in Neary (2001).

advanced and depressed regions and divergence of per capita incomes. To summarise, the ‘new economic geography’ literature may predict both convergence and divergence.

## 2.2. Empirical evidence on convergence in Europe

There have been numerous attempts to give a formal definition of convergence (see Quah, 1993). Two concepts stand out in the empirical literature:  $\beta$ -convergence and  $\sigma$ -convergence.<sup>8</sup> This Section defines both concepts and discusses the empirical evidence for the EU. It first concentrates on whether poor regions in Europe have caught up with richer ones. Second, it considers convergence within EU countries.

### $\beta$ - and $\sigma$ -convergence

There is  $\beta$ -convergence in a cross-section of economies if there is a negative relation between the growth rate of per capita GDP and the initial level of income. This type of convergence receives its name from the coefficient  $\beta$  in the neo-classical growth framework. In particular, it refers to the coefficient  $\beta$  in the following growth-initial level regression:

$$\tilde{y}_{i,T} = \alpha + \beta \ln y_{i,t_0} + u_{i,T}$$

Where  $\tilde{y}_{i,T}$  denotes the average yearly growth rate of GDP per capita in region  $i$  between the years  $t_0$  and  $T$ ,  $y_{i,t_0}$  is initial GDP in year  $t_0$  and  $U_{i,T}$  the specific shocks between times  $t_0$  and  $T$ .

Recall that in neo-classical model, the further an economy is below its steady state level, the faster it will grow. Similar economies will, therefore, eventually converge to the same level of income. Thus, the neo-classical model predicts a negative coefficient for  $\beta$  which measures the speed of convergence. Barro and Sala-i-Martin (1991) use this model in their influential empirical analysis of convergence across US states. They find ample evidence for the convergence hypothesis. Similar regressions have been done in numerous subsequent papers for different samples. The general conclusion is that there is indeed convergence. Moreover, the estimated coefficients are surprisingly similar across different data sets and point to a speed of convergence of about two percent per year (Sala-i-Martin (1996)).<sup>9</sup>

Another popular measure for convergence is called  $\sigma$ -convergence. This refers to the dispersion ( $\sigma^2$ ) of per capita income across groups of economies and is normally measured either by the standard deviation of log GDP per capita or by the coefficient of variation of GDP per capita.<sup>10</sup> If the cross-sectional dispersion falls over time, there is  $\sigma$ -convergence for the economies in the sample. Hence, it does not matter whether a single economy converges to a steady state, but rather how the entire cross-section of economies behaves.

Comparing both concepts,  $\beta$ -convergence studies the mobility of income within a distribution, whereas  $\sigma$ -convergence studies how the distribution itself evolves. It is possible that there is  $\beta$ -convergence without  $\sigma$ -convergence (a well-known example is the yearly ranking of sport teams in a competition, where  $\sigma^2$  is constant by definition and teams at the bottom of the table can still be next year champions and vice versa).  $\beta$ -convergence, however, is a necessary condition for

<sup>8</sup> This terminology was first introduced by Sala-i-Martin (1990).

<sup>9</sup> Quah (1996) points out that the constant speed of convergence across data sets could result from an unit root process.

<sup>10</sup> Dalgaard and Vastrup (2000) show that these two measures can lead to different conclusions. The reason is that they assign different weights to the individual countries’ growth performance. In our analysis, it appears that, although the magnitude of the degree of convergence differs among the two methods, the qualitative conclusions are equivalent. Therefore, this chapter solely focuses on the standard deviation of log GDP per capita.



$\sigma$ -convergence. Unless economies continuously leapfrog, both measures give the same conclusions. Below empirical evidence is presented about both  $\beta$ - and  $\sigma$ -convergence.

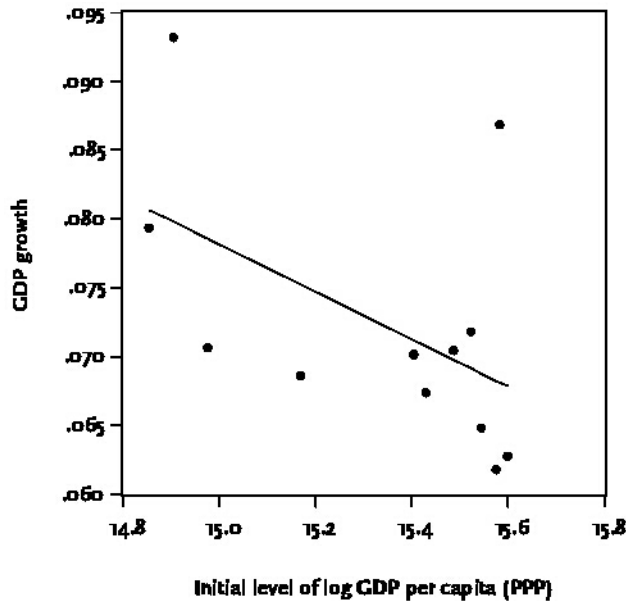
### Evidence on convergence in the EU

To explore  $\beta$ -convergence, Figure 2.1 shows the relationship between the log level of GDP (in PPP) per capita in 1977 and its growth rate between 1977 and 1996 for twelve EU countries.<sup>11</sup>

There is a clear pattern of catching-up. To illustrate, Ireland is the fastest growing country in the EU and features among the lowest levels of GDP per capita in 1977. Germany is among the richest countries in 1977 and shows a relatively poor growth record. The rate of convergence in Figure 2.1 is 2.1% per year.<sup>12</sup> This suggests that it takes about 33 years to cover half the initial gap between a poor and a rich region.

Regarding  $\sigma$ -convergence, the standard deviation of log GDP per capita clearly declines (from 0.282 in 1977 till 0.246 in 1996). Hence, also the development in the dispersion of per capita income suggests that there has been convergence among the countries in Europe. Summing up, this analysis gives a first indication of convergence in Europe during the last two decades.

Figure 2.1 Convergence among EU-countries 1977-96



The analysis of convergence is also possible at a regional level. The EUROSTAT regional database contains the level of gross regional product per capita in NUTS II regions between 1984 and 1996 (ESA79 methodology). The data in Figure 2.2 refer to 160 regions out of a possible maximum of 210. This choice is governed by the availability. The Figure depicts the scatter of the initial 1984-(log) level of GDP per capita (in PPP) and its growth rate between 1984 and 1996 for these regions. Again, the Figure reveals a catching-up process: the initially poorer regions tend to grow faster than richer regions. The rate of convergence for the NUTS II

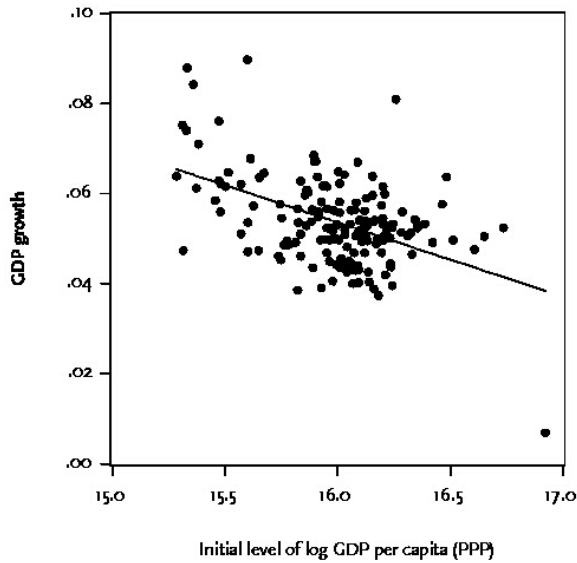
<sup>11</sup> Data for Austria, Sweden and Finland are excluded since they were not a member of the EU until 1995. The choice for the time period is governed by the availability of data.

<sup>12</sup> The choice of countries is important for the results. For instance, if Luxembourg is excluded from the sample, the estimated rate of convergence is 3.2% instead of 2.1%.

regions is estimated at 1.8% per year.<sup>13</sup> The degree of absolute  $\beta$ -convergence between EU-regions seems to be in line with the magnitude that Sala-i-Martin (1996) reports for different samples.

Regarding  $\sigma$ -convergence between European regions, the standard deviation of log income per capita declined from 0.280 in 1987 to 0.248 in 1996. Hence, both between countries and between smaller geographical units, there has been convergence in Europe during the last decades.

Figure 2.2 Convergence in NUTS 2 regions (1984-96)



### Evidence on convergence within EU countries

An important problem with the concept of unconditional  $\beta$ -convergence is that it assumes that all regions converge to the same steady state level of income. Recall from the discussion in Section 2.1 that this implies that the economies in all the different regions can be identically represented. This assumption may be too heroic for the different European regions. Indeed, it seems likely that steady states differ among EU-countries because of variation in institutional settings, sectoral patterns of production (due to different comparative advantages), educational levels, technology, preferences and so on.

If countries differ in these respects, the correct formulation of the empirical model controls for variables that affect the growth rate of the economies in the sample. In this way, the influence of initial backwardness on growth can be separated from other influences. The relevant question is whether economies tend to converge to the same level of per capita GDP, provided that other factors are conditioned on. This alternative concept is called conditional  $\beta$ -convergence: it is convergence that is conditional on the country-specific steady-state level.

<sup>13</sup> The point at the bottom right of the Figure refers to the region of Groningen in The Netherlands. This region exploits natural gas and, therefore, has a high GDP per capita. Lower gas prices during the eighties are responsible for the low growth rate of this region. If Groningen is excluded, the yearly rate of convergence drops to 1.5%.

More specifically, conditional  $\beta$ -convergence occurs if the coefficient  $\beta$  in the following modified expression is negative:

$$\tilde{y}_{iT} = \alpha + \beta \ln y_{i,t_0} + \sum_i \gamma_i x_{iT} + u_{iT}$$

Where  $x_{iT}$  are variables that determine the country-specific steady state. Testing for conditional  $\beta$ -convergence is usually difficult because the country-specific steady-state value of output is unknown. Indeed, it depends on hard-to-measure (especially at the regional level) variables such as the parameters of technology and preferences. Several researchers have nevertheless explored conditional  $\beta$ -convergence, thereby using indicators that potentially control for the country-specific steady state. Interestingly, a variety of these studies have found that the estimates of  $\beta$  do not change substantially when these control-variables are included (see e.g. Barro (1991)).

This section makes no further attempt to estimate conditional  $\beta$ -convergence along these lines. Instead of controlling for the variation between regions, regions within a country are assumed to be similar in terms of institutions, technology and preferences. Accordingly, countries have their own country-specific steady state levels of income to which their regions may converge. The relevant question then is whether regions within a country do indeed converge to their country-specific steady state. Below, this is explored with the data on the GDP per capita on the NUTS II level, as presented in the previous Section. Figure 2.3 reveals the relationship between growth and initial levels of GDP per capita in 12 countries of the EU. Note that the time period for various countries differs in these Figures. The estimated yearly speed of convergence is also calculated per country. The results are presented in Table 2.1.

Table 2.1. *Convergence within countries*

Countries	# of regions in the sample	Years	Yearly rate of convergence ( $\beta$ ) <sup>a</sup>	$\beta$ -convergence?	Initial $\sigma$	$\sigma$ (1996)	$\sigma$ -convergence?
Germany	37	1991-96	- 10.3 % **	yes	0.457	0.285	yes
France	21	1980-96	0.0 %	no	0.137	0.146	no
Italy	20	1980-96	0.3 %	no	0.265	0.282	no
United Kingdom	29	1977-96	- 1.7 %	yes	0.091	0.128	no
Spain	18	1980-96	- 1.4 % *	yes	0.207	0.191	yes
The Netherlands	12	1986-96	- 5.2 % **	yes	0.238	0.164	yes
Belgium	11	1977-96	- 0.6 %	yes	0.234	0.221	yes
Sweden	6	1985-96	1.5 %	no	0.087	0.107	no
Austria	9	1988-96	- 1.5 % **	yes	0.261	0.235	yes
Finland	4	1988-96	- 1.9 % **	yes	0.238	0.222	yes
Greece	13	1977-96	- 3.5 % **	yes	0.183	0.153	yes
Portugal	7	1988-96	- 3.5 % *	yes	0.234	0.188	yes

<sup>a</sup> A \* (\*\*) indicates significance at the 10% (5%) confidence level.

Figure 2.3 reveals strong evidence for convergence in Germany. The estimated speed of convergence is more than 10%. This reflects the catch-up of East-German regions with their Western counterparts. If the analysis is restricted to the Western regions alone, convergence among regions almost disappears.

A clear tendency to regional convergence is also found in most other countries. The estimated yearly speed of convergence is significant and ranges from 1.4% in Spain to 5.2% in the

Netherlands. Austria, Finland, Greece and Portugal lie within this range. In Belgium and the United Kingdom, the convergence hypothesis gets weak support: for these countries the parameter  $\beta$  is also negative, but now insignificant.

For three other countries – Italy, France and Sweden – the evidence points to divergence between regions. For both France and Sweden Figure 2.3 shows that this is due to a single region within the country: in France the rich region around Paris has featured a high growth rate, whereas in Sweden the Stockholm region is the outlier. If the Paris region is left out, the estimated speed of convergence becomes significant at 2.2% per year. This provides some evidence for the relevance of the economic geography literature (see Section 2.1).

Italy is the real exception. Divergence is the rule rather than the exception for regions in Italy. This illustrates the substandard performance of the relatively poor Southern part of Italy, the so-called Mezzogiorno.

Table 2.1 also contains information on  $\sigma$ -convergence<sup>14</sup> within countries. The presented statistics mostly point in the same direction as the evidence on conditional  $\beta$ -convergence. The only exception is the United Kingdom for which weak evidence for  $\beta$ -convergence is accompanied by  $\sigma$ -divergence. For all other countries, both measures yield the same conclusion. In general, it seems safe to conclude that there has been convergence between regions in the majority of countries of the European Union.

The question of convergence in the EU has attracted attention in a number of studies. The European Commission (1999d), for example, is pleased with ‘the surprisingly rapid rhythm of convergence in an historical or international prospect over the period 1986-96’. Others, however, claim that evidence of convergence has weakened (Boldrin and Canova, 2001) or even has come to an end (Fagerberg and Verspagen, 1996) after the early 1980s.

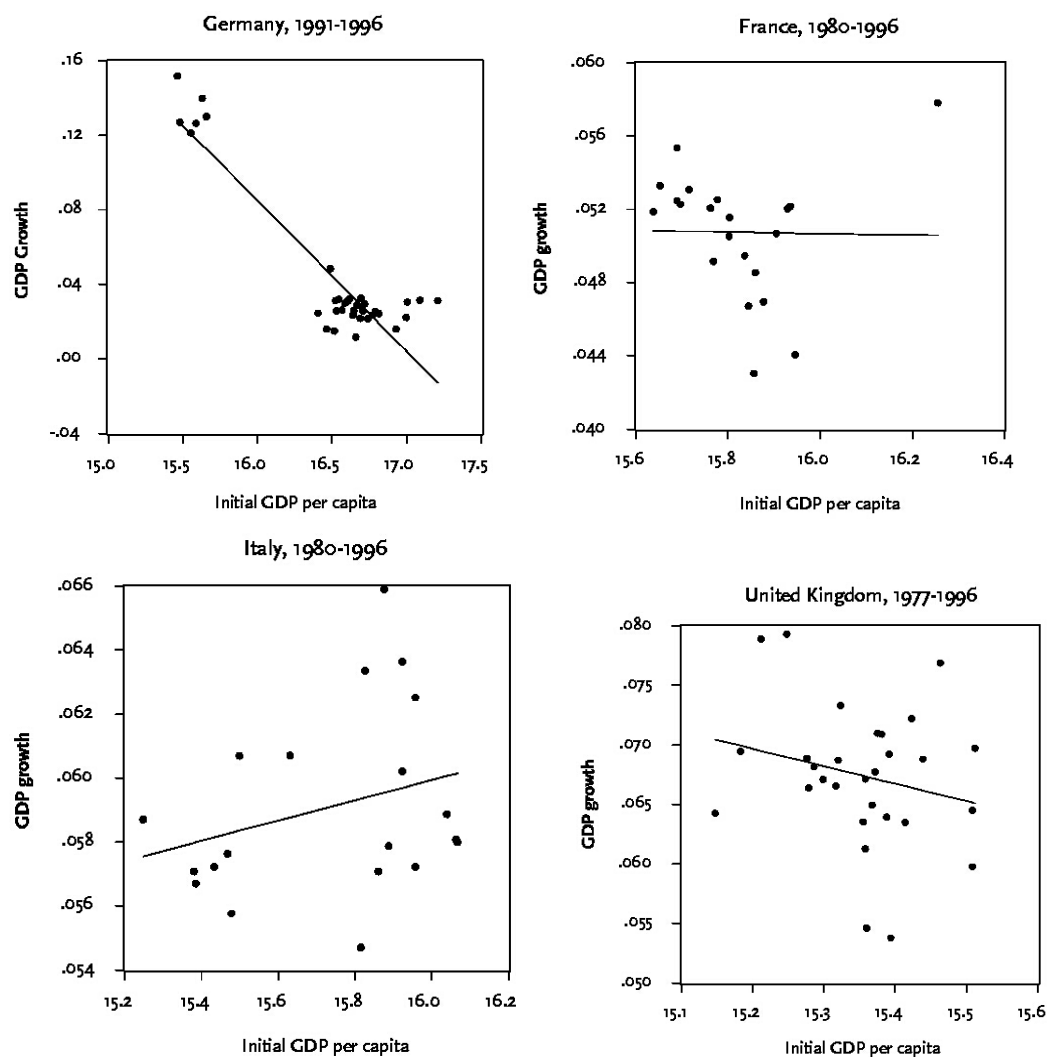
The results, as presented in this Chapter, confirm that there has been convergence in Europe during the last decades. Yet, the rate of convergence is quite low at about 2% per year. These estimates correspond with the stylised facts reported by Sala-i-Martin (1996). Furthermore, convergence exists both between and within countries. This latter finding contrasts with some earlier studies. Cappelen, Castelacci, Fagerberg and Verspagen (2001), for example, argue that ‘within countries there is on average no convergence’. In addition, the European Commission (2000) suggests that convergence at the level of member states be accompanied by a widening of regional disparities in countries experiencing high growth. These results are interpreted as support for the Williamson hypothesis, as discussed in Section 3.1.

The presented evidence shows that the process of catching-up of relatively poor countries is accompanied by a decline of regional income disparities. Indeed, the divergence hypothesis is rejected for the majority of countries. Nevertheless, major differences exist with respect to regional convergence between countries, as was also stressed by Fayolle and Lecuyer (2000). The best, or perhaps worst, example is Italy. In this country, per capita GDP between regions has diverged over the last decades. This widely quoted Italian experience may have led people to believe that divergence is a common phenomenon in European countries. Italy, however, is a noteworthy exception to the rule. In the majority of countries, there is clear evidence for convergence among regions.

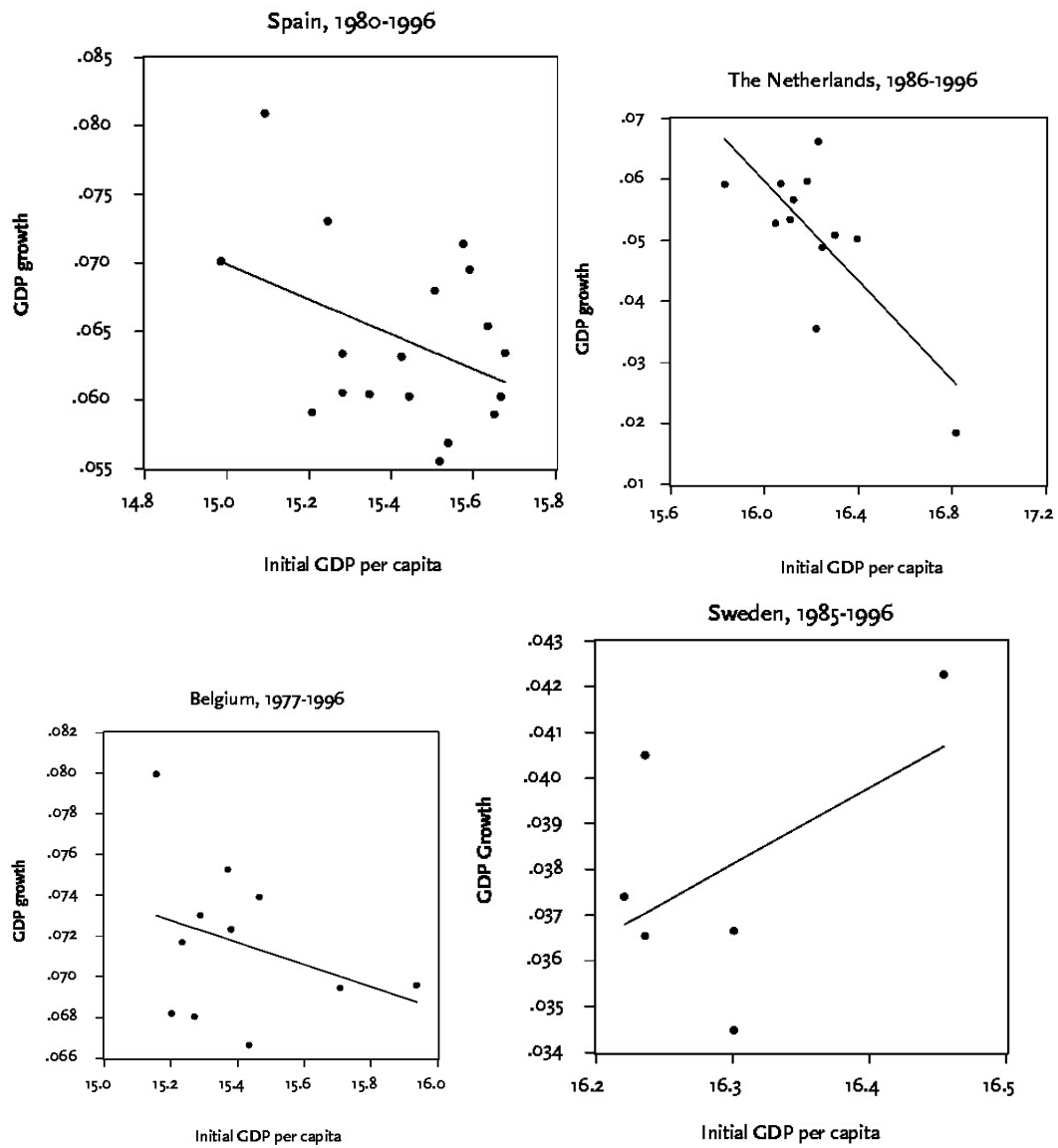
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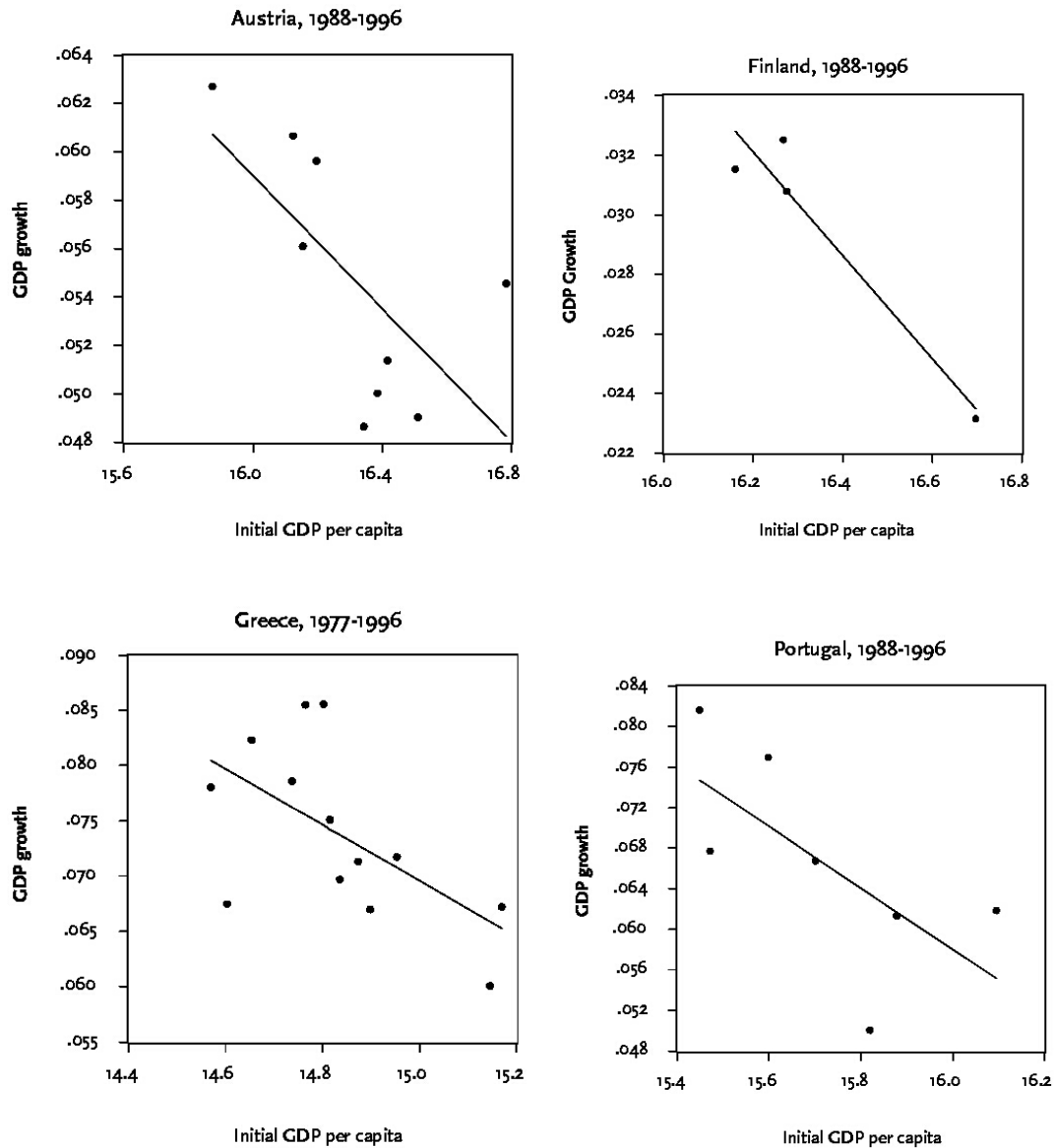
<sup>14</sup> The standard deviation can fluctuate heavily from one year to the next. This is partly explained by the lack of data for specific regions for specific years. For example, GDP data for the UK regions are completely missing for 1982, 1983, 1985, 1986 and 1990. The analysis is therefore restricted to the longest period for which a representative sample of regions for both the initial and the last year was available.

Figure 2.3. Convergence within countries<sup>15</sup>



<sup>15</sup> GDP is measured in Purchasing Power Parities. The time period that is used is indicated above each Figure. At the horizontal axis is the logarithm of GDP per capita in the appropriate initial year.





### 2.3. Conclusions

Various economic theories explain the patterns of economic growth. These different concepts lead to contrasting views on convergence. In particular, whereas the neo-classical theory and the technology-gap literature predict that income disparities between economies will disappear, the endogenous growth and the new economic geography literature typically predict divergence between countries. This Chapter considers the empirical support for both predictions by means of two common concepts of convergence:  $\beta$ - and  $\sigma$ -convergence. Clear evidence is found for the convergence-hypothesis both on the country level and the regional level: poor countries and poor regions tend to catch up with richer ones at a rate of approximately 2% per year. Furthermore, the evidence supports convergence within countries: in the majority of EU countries regional disparities in income have declined over the last decades. It seems, therefore, that the European Commission succeeds in its aim of reducing welfare differences between

regions. The crucial question is, however: What is the contribution of cohesion policy to this process of convergence? Is convergence a process that works via the market as suggested by neo-classical theory? Or is it relaxed through or strengthened by the transfer of funds? The next chapter addresses this question.



## CHAPTER 3

### THE IMPACT OF COHESION POLICY ON CONVERGENCE

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This chapter sheds light on the main question of this study: what is the impact of cohesion policy on convergence? It does so by exploring the theoretical basis of the relation between cohesion policy and convergence, and by comprehensively reviewing previous evaluations of this impact.

#### 3.1. Cohesion policy and convergence

##### **Cohesion policy should foster convergence**

Economic theory leaves scope for a positive role for cohesion policy. Chapter 2 presented three different strands of models: one building on the Solow growth model, a second on the technology gap perspective and a third on agglomeration forces. Within either strand, cohesion support may foster convergence.

The Solow growth model predicts that, if a region spends a continuous stream of cohesion support on productive public investment, then its steady state level of GDP per capita increases., Its present rate of economic growth, therefore, rises as well. This argument hinges on the positive impact of public investment on production. Empirical evidence suggests that this impact is substantial. A meta-analysis by Hakfoort and Rietveld (2002) shows that the output elasticity of public investment ranges from -0.37 to 0.77 with an average of 0.14. Thus, a 1% increase in the public capital stock typically raises production by 0.14%.

The technology gap perspective suggests that, if a region spends cohesion support on promoting indigenous technological progress, exploiting technologies developed elsewhere or the capacity to utilise existing technological potential, then its productivity converges more rapidly to the levels of more advanced regions. There is no consensus in the literature about exactly which factors contribute to bridging the technology gap. Nevertheless, a high level of research and development and a focus on technologically progressive industries are obvious candidates. Cappelen, Castellaci, Fagerberg, and Verspagen (2001) present evidence that is consistent with this thesis. They find a positive correlation of regional economic growth with research and development, and a negative one with the relative importance of agriculture.

The agglomeration forces prevalent in the new economic geography literature bring about a clustering of economic activity. The line of reasoning is roughly that if a firm locates in, say Berlin, then it is more attractive for a second firm to locate there as well instead of in Brandenburg or Mecklenburg-Vorpommern. This holds true a fortiori for subsequent firms until centrifugal forces such as rising wages and congestion bring about equilibrium. Cohesion support for Brandenburg and Mecklenburg-Vorpommern is probably insufficiently potent to tip the balance in favour of these lagging regions, and to reverse the agglomeration dynamics that prevail at present. Nevertheless, it could perhaps retard the process or, depending on how it is spent, support equilibrium with a more equal distribution of economic activity. Note, however, that it obstructs the reaping of the increasing returns to scale gains associated with agglomeration. Thus, unlike in the Solow and technology gap frameworks there is an equity-efficiency trade off here.<sup>1</sup>

##### **Cohesion policy may fail**

Cohesion policy is not necessarily effective in fostering convergence. Note that its positive impact under either strand of models is conditional. In particular, under the Solow growth model, it should at least partly lead to additional public investment. If it is spent on public consumption, then it exerts only a temporary demand effect on the economy. Furthermore, crowding out is of paramount importance. Once national governments receive aid from

Brussels, they may retrieve their own funds for regional projects in lagging regions (Dignan, 1995). The EC recognises the danger since it requires co-funding from national governments. Co-funding does not, however, appear to solve the problem, at least not entirely. Bachtler and Taylor (1996) claim that the documents upon which the allocation of the cohesion support is based are little more than a paper exercise designed to legitimise EU co-financing of predetermined regional projects. If this would be true then cohesion policy would not lead to additional public investment in lagging regions, since the projects that are being financed would have been undertaken anyway. Chapter 4 comes back to this issue.

Cohesion support may replace alternative economic processes that bring about convergence. In particular, Boldrin and Canova (2001) point out that cohesion support might induce labourers to remain in poor regions where they would otherwise have migrated to richer regions. Since labour mobility is a powerful means to achieve wage equalisation, cohesion support thus retards convergence. Some opponents of cohesion policy bluntly put that it boils down to subsidising unemployment. Although this is probably an exaggeration, it may contain a grain of truth.

Chapter 1 reveals that cohesion policy does redistribute funds from rich to poor regions. Even the richest regions receive some support however. This obviously weakens the impact on convergence. Moreover, Martin (1998b) argues that redistribution is less strong than is often believed. If one considers only those projects that are likely to contribute most to the stock of public capital (Martin calls this type of projects 'investment in the productive sector') then the spread of cohesion support is much more even among regions. Redistribution is weakened further if one takes regional policy of nations into account. In particular, Martin (1998b) points out that rich member states tend to be relatively active in supporting regions that are relatively poor from only a national perspective.

The rate of return to projects financed by the EU may be relatively low because they are typically based on a distorted cost-benefit analysis. In particular, regions consider the full benefits of a project, but only their own cost of funds, not the ones provided by the EU. Thus, at the margin the social rate of these projects is rather low. To a certain extent this is what cohesion policy is supposed to achieve: to support projects that otherwise, would not have been undertaken. Nevertheless, cohesion policy induces rent-seeking: it provides an incentive to propose projects that are most likely to attract support rather than projects with the highest social return.

### **3.2. A history of evaluation**

Cohesion policy has the potential to foster regional convergence within the EU. Crowding out, weak redistributive efficiency, and rent-seeking may, however, dampen or even annihilate its positive impact. Many evaluation studies have sought to shed light on the extent to which cohesion policy indeed reduces differences in welfare between regions. This Section reviews these studies.

During the early days of European cohesion policy, there was little adequate evaluation of the effectiveness of the expenditure. Bachtler and Michie (1995) give three reasons for this. First, European funding got mixed up with national budgets for regional policy. Second, research within the EC was poorly coordinated as different Directorates General (DG's) and even different units within the same DG had different perspectives on what cohesion policy was supposed to achieve. Third, evaluation techniques varied greatly throughout the EC, mainly because of a lack of guidance from the EC. In any event, the official objectives of cohesion policy, opaque as they were, did not provide clear benchmarks by which funding could have been measured.

A systematic evaluation got under way in the aftermath of the Single European Act of 1987 (McEldowney, 1991; Vanhove, 1999). The EC geared the ESF, the guidance Section of the

EAGGF, and particularly the ERDF more clearly towards lagging regions, and sought to standardise the evaluation of these funds. Regions had to come up with 'Community Support Frameworks' and 'Special Planning Documents', writings that specified quantifiable objectives. These objectives ranged from 'specific', such as the building of a number of kilometres of road, to 'global', such as contributing to the growth of gross regional product per capita. Moreover, 'Monitoring Committees' with representatives from member states as well as the EC ensured some degree of consensus about evaluation techniques.

The result of this effort was some 300 studies, summarised in EC (1992). The general picture from these studies is that cohesion support had a substantial impact on the growth of gross regional product per capita and employment. Bachtler and Michie (1995) are, however, critical of this conclusion. They hold that 'Much of the Commission's assessment of the impact of the Funds was highly subjective' (Bachtler and Michie, 1995, p. 746). Moreover, they find inconsistencies in evaluation between countries and regions as well as a varying quality of studies. They claim that 'it would be desirable to move away from considering the Structural Funds', 'evaluation process as a series of isolated, separate studies or exercises to a longer term approach' and that 'there is scope for developing further the quality of monitoring information, especially data relating to the physical output of projects and programmes' (Bachtler and Michie, 1997, p. 857).

Equally critical of the chaotic patchwork of incomparable case studies is Ernst & Young. Its synthesis report reviews the evaluation of Objective 2 programmes for the period 1989-93. Subjectivity is again the issue here, since the report disapproves of evaluation being carried out by the same regional authorities that are responsible for the implementation of the programmes (Ernst & Young, 1996).

The EC responded by designing tighter evaluation procedures (EC, 1999a, 2001a). Simultaneously, it instigated research projects centred around simulation models that were designed to measure the macro-economic impact of the cohesion policy (EC, 1999c). Furthermore, econometric studies were carried out in order to evaluate the effectiveness of cohesion policy. The rest of this Section discusses studies based on case studies, model simulations or econometric estimates, respectively, to evaluate the effectiveness of cohesion policy.

### **3.3. Case studies**

There are a wide variety of case studies in which single projects are evaluated. Some focus on the way in which the funds are actually spent. Others emphasise the impact of the funds on local authority practices. Still others deal with macroeconomic implications. Below, we give a general impression of the studies along these lines.

#### **Kilometres of road and numbers of jobs**

A study by Huggins (1998) on Objective 2 programmes in industrial South Wales exemplifies the spirit of many case studies. It contains a detailed description of the socio-economic situation in that region, as well as of the programme to be financed by the cohesion support. The evaluation itself boils down an enumeration of stretches of road that have been constructed, jobs that have been created and so on. In addition, bottlenecks in the programme, which often refer to the relation between the regional and national governments on the one hand, and the EC on the other, are spelled out. Another example is Daucé (1998), who reviews a development program for the most depressed rural areas in Burgundy. He concludes, as do many others, that evaluation procedures need to be improved in order to draw lessons with confidence.

Ernst & Young (1996) coordinated research undertaken in Objective 2 regions to evaluate the impact of the 1989-93 Structural Fund interventions. They base their results predominantly on

case studies and ‘in depth’ studies involving interviews with a sample of project sponsors. Since Objective 2 money is typically spent on projects that facilitate absorption of employees that enter the labour market after the closure of mines, shipyards and the like, its impact is most naturally measured in terms of employment. The report estimates that the €6 billion of Objective 2 money created approximately 850 thousand ‘gross’ jobs, and 450 thousand ‘net’ jobs. The difference is attributable to crowding out of national regional aid and non-assisted firms and employees. Thus, a gross job costs €7,000, and a net job €13,000. If one also takes the public and private co-funding into account, then the price rises to almost €42,000. This translates into an unemployment rate in Objective 2 regions that is 0.8 percentage points lower than it would have been without cohesion support. The EC (2001a) takes the appraisals and case studies at face value, and simply adds up the numbers of jobs created by the distinct Objective 2 projects. It arrives at a price of €33,000 per job for the period 1994-96 and €24,000 for 1997-99.

The EC itself tends to be positive about the impact of cohesion policy. Its verdict is that the dozens of Cohesion Fund programs that have been evaluated contributed significantly to productivity growth and employment (EC 1999b).

Lolos (1998) evaluates the macroeconomic and structural policies in Greece and Portugal over the 1980s and 1990s. Through an eyeball analysis of the historical data on economic performance and policy, he concludes that cohesion support in Portugal has been more successful than in Greece. He conjectures that this is so mainly because of differences in political ‘polarisation’ that obstructs restructuring the economy in the latter member state.

### **Putting the pieces together**

Some researchers feel that simply adding up kilometres of road or numbers of jobs is inadequate. They incorporate single projects in regional economic models that capture all sorts of spillover effects. Venables and Gasiorsek (EC, 1999c) adhere to this principle. Their general equilibrium model incorporates a set of regions linked by a transport network. Public investment in this transport network directly affects prices, sales and profits. In response to these changes, entry and exit of firms may occur. The model has a strong ‘new economic geography’ flavour, where reductions in transport cost have agglomeration spillovers. It pertains to six major projects in Spain, Greece, Ireland and Portugal. The model suggests internal rates of return between 12% for the Egnatia highway in Greece to no less than 1688% for the Madrid ring road. The latter Figure is of course too good to be true. Nevertheless, their analysis does hint at the possibility that cohesion support may trigger substantial regional economic benefits due to the increasing returns to scale that pertain to agglomeration externalities.

Other researchers have tried to amalgamate individual case studies. Das Neves (1994), for example, attempts to get an idea of the impact of cohesion support on the entire Portuguese economy from reviewing various Portuguese projects. He concludes that this impact is smaller than is often believed. The reason is that often gross instead of net receipts are considered.

### **Critical assessment of case studies**

Dignan (1995) concludes, partly on the basis of case studies, that the original ERDF was ineffective. This is largely because of its small scale, but also because ‘resources were not necessarily concentrated on the regions most in need’, because ‘the workings of the Fund were largely uncoordinated and somewhat ad hoc’ (Dignan, 1995, p. 85). Things got better with the reform of the Cohesion support following the Single European Act. The ERDF and the newly created ESF and EAGGF were more spatially concentrated, much larger in scale and increased coherence due to the introduction of the ‘three-tier planning system’ involving regional plans, community support frameworks and operational programmes. Yet, Dignan remains critical of their impact: ‘in proportional terms, both the ERDF and the remaining cohesion support form a significant share of investment spending and total GDP in the Objective 1 regions. To that

extent, the funds can be expected to have sizeable short-term impact on spending and growth. [...] It is, however, much more difficult to evaluate the development impact of the Cohesion support and their efficacy in promoting sustained convergence.’ (Dignan, 1995, p. 89). First, there is the problem of the counterfactual. How can we ever know, so he asks, how the Objective 1 regions would have fared without cohesion support? Second, there is the problem of additionality. National governments may retrieve their own regional funds once they receive aid from Brussels.

Bachtler and Taylor (1996) review cohesion support allocation under Objective 2 for the second planning period running from 1994-99. They base their research on appraisals of projects and surveys of EU officials. They do not arrive at a quantitative impact. Instead, they take stock of the type of projects financed by the Cohesion support. Frontrunner is training for employees, aid to firms comes second, and economic infrastructure third. Other important goals are R&D and tourism. Bachtler and Taylor arrive at the mildly positive conclusion that ‘the process of formulating programmes has given an impetus to strategic planning and development’ (Bachtler and Taylor, 1996, p. 730). Yet they are also critical: projects often ‘lack a clear rationale’. Furthermore, it is ‘difficult to establish coherence of EU-funded strategies with the broader policy context’, notably with national and regional development policies. In addition, ‘programme designers appear to have faced problems in effectively incorporating the environment as an integral part of the strategies’. Finally, the allocation procedure is ‘over-elaborate or bureaucratic’, which raises questions about procedural efficiency (Bachtler and Taylor, 1996, p. 731).

Bachtler and Turok (1997) invited a number of experts to bring together practical experience of cohesion support in different regions and countries. Their book contains a number of case studies for the United Kingdom, Germany, The Netherlands, Austria, Finland and Sweden. The common thread is that it proved difficult to achieve coherence of often large, ad hoc projects, in spite of the reform that introduced regional plans, community support frameworks and special planning documents. Moreover, the economic effects of cohesion support were hard to quantify and most were probably modest. Cohesion support influenced, however, local authority practices. It encouraged cooperation and strategic planning. Unfortunately, it also induced rent-seeking. In particular, regional plans are often designed to draw down the funds rather than to aid efficient allocation expenditure.

### **To wind up**

There are many case studies about the impact of cohesion policy on the growth of gross regional product per capita and employment. Most case studies bring up some kind of reservation about the effectiveness of cohesion policy, but they rarely present quantitative estimates of its impact. It is therefore impossible to make an objective assessment on the basis of these individual project appraisals.

### **3.4. Model simulations**

Model simulations complement the more traditional case studies in a number of ways. First, they make it easier to evaluate the degree to which cohesion support contributed to regional productivity or employment on a macro level. Second, they explicitly model general equilibrium consequences of cohesion policy and sometimes include externalities. Third, they provide the counterfactual economic development in the absence of cohesion support against which economic development in the presence thereof could be measured. This is important since the mere concurrence of a slow growth and cohesion support does not necessarily mean that the latter have failed: regions might have done worse had they not received support. Model simulations were particularly useful for coming to grips with long run supply side effects. These are, as Begg, Gudgin and Morris (1995) note, more difficult to quantify than the short run

demand effects. In practice, various models coexist: some emphasise Keynesian demand effects, others emphasise supply side effects and still others incorporate both. This subsection discusses a number of these simulation studies.

### **Macroeconomic models of the EU**

The first attempt to evaluate cohesion support through model simulations was by incorporating them in the HERMES model, which was originally developed to analyse supply side shocks in the 1970s and 1980s. The full-blown version of the model ran, however, only for Ireland (Bradley, 1992; Bradley, Fitz Gerald and Kearney, 1992). These exercises reveal that cohesion support for 1989-1993 raised Irish GDP with 2.6 % by the year 2000. The impact on GDP per capita is, however, much smaller, mainly because the more favourable economic development reduced emigration from Ireland. Bradley (1995) notes, that sizeable positive spillovers to the UK are not included in this number.

The gap in geographical coverage was filled by the HERMIN model, the successor of HERMES (Bradley, O'Donnell, Sheridan, and Whelan, 1995; Bradley, Modesto, and Sosvilla-Rivero, 1995; Bradley, 2000), which ran for Ireland (Bradley, Whelan, and Wright, 1995) as well as Spain (Herce and Sosvilla-Rivero, 1995), and Portugal (Modesto and Neves, 1994; Modesto and Neves, 1995). Bradley, Herce, and Modesto (1995) used HERMIN to assess the macroeconomic effects of cohesion support for the period 1994-1999 on Ireland, Portugal and Spain. Sosvilla and Herce (1998), Christodoulakis and Kalyvitis (1998a, 1998b, 2000), and the EC (2000) did other studies along HERMIN's lines. They focused on Spain, Greece, and all four cohesion countries respectively. All studies find a positive impact of cohesion support, similar to what HERMES predicted for Ireland. In particular, these studies find that the contribution of cohesion support to productivity growth is in the order of magnitude of tenths of percentage points of extra growth (net of the support itself) per unit of cohesion support (1% of GDP). Chapter 5 provides an overview of these results.

The EC (1999a, 1999b, 2001a) reports the results of other simulations with HERMIN as well as from QUEST, a model of the EC that focuses on the demand side (Röger, 1996). The EC claims that various studies undertaken to assess the impact of cohesion policy on assisted regions indicate that they have made a significant contribution to the reduction in regional disparities across the EU and that a significant proportion of the catching up that these countries have experienced over the period 1989-99 would not have happened in the absence of support.

### **Non EC model simulations**

Outside the EC, Gaspar and Pereira (1992) were among the first to assess the impact of cohesion policy through model simulations. They developed a two-sector endogenous growth model of private, public and human capital accumulation. The model is applied to Portugal. The results suggest that ongoing structural changes have a substantial and permanent impact on economic growth and contribute markedly to the process of real convergence of the Portuguese economy to EU standards. The impact of cohesion support on public deficits, current account, and real exchange rates however, adversely affects the long run requirements of nominal convergence and exacerbates the need for budgetary restraint. The reason is that projects financed by cohesion support require co-funding by the national governments. This raises either public deficit or the need for budgetary constraint and adversely affects the real exchange rate and current account. Gaspar and Pereira thus provide an economic rationale for the often heard complaint that the co-funding requirements are too demanding.

Goybet and Bertoldi (1994) report another early example of a simulation exercise. They summarise assessments of the impact of the cohesion support in Objective 1 regions on the basis of models that range from a neo-Keynesian to dynamic general equilibrium with endogenous growth. These assessments conclude that the supported regions should be able to grow faster

than the community average. In particular, they should be able to grow at an annual rate of 3% against 2.7% for the EU as a whole and against 2.6% of what they would have achieved in the absence of cohesion policy.

Lolos, Suwa-Eisenmann, and Zonzilos (1995) and Lolos and Zonzilos (1994) explore the impact of cohesion support on Greece with a somewhat smaller applied general equilibrium model. Their assessment of projects implemented between 1989-93 is mixed: demand side effects are substantial for 1992 and 1993, but peter out afterwards, whereas supply side effects are more persistent, but smaller.

Pereira (1997, 1999) used an endogenous growth model to assess the impact of the cohesion support for the period 1989-93 on the growth paths of Greece, Ireland and Portugal. The results suggest that it had a substantial impact on economic growth in these economies and contributed markedly to the convergence to EU standards. Their relative long-run position would, however, still be far from EU standards, which suggests the importance of continuing the transfer program. Similar results were obtained by Gaspar and Pereira (1995) and Pereira and Gaspar (1999).

### **Critical assessment of model simulations**

The overall conclusion from simulation exercises is that cohesion support contributes significantly to regional growth and employment. Again, this conclusion is not accepted without criticism. Cappelen, Castellaci, Fagerberg and Verspagen (2001), for example, claim that the simulation estimates are imprecise. The reason is that they are obtained in an indirect manner, typically by shifting public investment curves rather than by an assessment of the impact of the policy itself. They conclude that the estimates thus 'depend more on the hypotheses underlying the model than on, say, what happens to regional support schemes' (Cappelen, Castellaci, Fagerberg and Verspagen, 2001, p. 1). This is all the more serious since the simulation exercises were often instigated by the EC. The HERMIN and QUEST projects therefore, did not resolve the problem of subjectivity. In a sense, the model simulations only give an idea about the potential effect, which is clearly positive, but does not account for several complications that may reduce the actual effectiveness of cohesion support, such as crowding out, inefficient allocation and rent-seeking.

### **To wind up**

The model simulations complement the case studies by providing the counterfactual how the regions would have fared without the cohesion support. They all suggest that cohesion policy has a large potential to foster growth and convergence. This provides a convenient benchmark against which growth of regional GDP per capita can be measured; however, they say little about their actual impact. The next Section discusses econometric analyses that mostly do estimate this actual impact.

## **3.5. Econometric studies**

Econometric studies consist of two categories: (i) those looking for indirect evidence regarding the impact of cohesion support on convergence and (ii) those that directly measure the extent to which regional growth is determined by the cohesion support. The ex-post econometric analyses thus complement the model simulations that are based on ex-ante evaluations.

### **Indirect evidence**

De la Fuente and Givès (1995) estimate a growth model that includes public and human capital. They conclude that infrastructure and education largely determine the location of mobile production factors. De la Fuente and Givès use their estimates to simulate the effect of cohesion

support on growth, thereby taking crowding out into account. Since the extent to which crowding out occurs is unknown however, they assume exogenous lower and upper bounds in their model. Their simulations show that public investments in infrastructure and education may indeed help to reduce regional disparities in income and growth of GDP per capita. In particular, the ERDF, because of its redistributive nature, has helped to achieve more equality across regions in Spain. They also touch upon the efficiency-equity trade off of regional policy. If all regional funds were distributed according to the same redistributive principles as the ERDF, then the dispersion of labour productivity would have been reduced. At the same time, however, Spanish national output would have been down due to a less efficient allocation of capital.

Martin (1998a, 1998b, 1999a, 1999b) and Boscá, Doménech and Taguas (1999) also find that regional policy variables, notably investments in public and human capital, foster growth. The scope for regional policy is, however, limited because of the inverse relationship between base year production and growth. The latter suggests that 'natural convergence' is important compared to convergence triggered through cohesion policy. Moreover, the analyses of both Martin and Boscá et al. indicate that regional policy can only contribute to regional convergence if the macroeconomic framework in the supported areas is conducive for growth. The differences in the national economic performance of Spain, Portugal, Ireland and Greece demonstrate clearly that this was not the case throughout the European periphery during the 1980-94 period.

Pissarides, Wasmer, and Bean (EC, 1999c) apply vector autoregression models to assess the socio-economic impact of projects financed by the Cohesion Fund for separate regions. They single out public investment as an exogenous variable, and subsequently estimate the impact of shocks of this variable on output. These shocks should be interpreted as Cohesion Fund spending. The picture that emerges from this exercise is positive. There are, however, striking differences between the marginal rates of return from public investment between regions. In Madrid for example, it is a number of times higher than in Extremadura.

### **Direct evidence**

A number of econometric studies directly measure the impact of cohesion policy on economic growth. Some of these studies find support for the convergence hypothesis. In particular, Fayolle and Lecuyer (2000) regress regional growth on member state dummies and access to cohesion support. They find that growth is enhanced by cohesion support, although its impact is strongly conditioned by national membership. Garcia-Solanes and Maria-Dolores (2001) estimate a standard neo-classical 'growth-initial level equation'. The annual growth rate of GDP per capita over the sample period 1989-99 is explained by a constant, initial GDP per capita and cohesion support per capita as a percentage of the European mean. They find a modest, but statistically significant effect.

Other econometric studies yield either mixed results, or are less positive on the growth effect of cohesion support. An early study is by Gaspar and Leite (1994) who estimate the long run impact of Cohesion support on growth of GDP per capita. They compare their results to the ones provided by computational dynamic growth models for the Portuguese economy. Whether the funds have an impact remains undecided.

Cappelen, Castellaci, Fagerberg and Verspagen (2001) consider two periods: a pre-Single European Act period running from 1980-89, and the post Single European Act period running from 1989-97. They estimate the impact of cohesion support on regional growth with a time slope dummy that controls for differences in impact between both periods. They find that cohesion support indeed fosters growth, albeit to a decreasing extent. In one of the regressions the impact even becomes negative.



ISAE (2001) argues that poor recipient regions have been unsuccessful to catch up with the rest of the regions. This leads them to conclude that cohesion support has been unsuccessful in fostering convergence. It remains possible however, that they would have done even worse had they not received cohesion support.

Garcia-Mila and McGuire (2001) estimate the impact of cohesion policy, in conjunction with Spanish national redistribution schemes on regional economic growth. They conclude that these policies have not been effective at stimulating private investment or at improving the overall economic performance of poorer regions. Striking is that with the rise of the cohesion support, national redistribution has diminished, which suggests that the latter has been crowded out.

Fagerberg and Verspagen (1996) are negative about both convergence and the impact of cohesion support thereon. They find that for 70 regions in six of the EU member states convergence has come to a halt after 1980, indeed the time when European Regional policy kicked off. Surprisingly, they also find that cohesion support has a negative impact on convergence. It suggests that cohesion support is worse than useless, or in other words, recipient regions would have done better without them.

Boldrin and Canova (2001) are not surprised to find that European regional policy bears little relation to economic growth. The data suggest this in two ways: first, convergence took place when European regional policy was absent, and stopped – with large disparities still present – when it was put in place; second, the income per capita of ERDF recipients hardly increases relative to the European mean.

### **Critical assessment of econometric studies**

Econometric studies of the impact of cohesion policy suffer from a lack of reliable data. The panel of cohesion support at the NUTS II level is incomplete. Moreover, the EC appears to be ignorant of the exact distribution of its own funds. The respective databases are, however, being updated, such that more reliable and more recent data should become available in the near future. Less rosy is the situation of the data on other variables at this level of disaggregation. A consistent panel, of regional investment data for example, simply does not exist. Researchers thus have to resort to the use of dummies or proxy variables. This obviously does not help to make a strong link between the various growth theories that underlie the analyses and the empirical research. The econometric studies therefore, tend to be somewhat ad hoc.

### **To wind up**

A few studies have econometrically estimated the actual impact of cohesion support on convergence. The evidence is mixed: some studies report a positive, some an insignificant and some even a negative effect. Overall, the econometric studies do not support a strong impact of cohesion policy on convergence.

### **3.6. Conclusions**

There is no consensus about the impact of cohesion policy on convergence. A large number of case studies, model simulations and some econometric analyses do not paint a consistent picture. Researchers draw different conclusions from different studies, ranging from a dismal negative impact of cohesion policy on economic growth of lagging regions to wildly positive assessments of projects, yielding rates of return that are unheard of in the private sector.

To a certain extent these differences are to be expected. In particular, model simulations measure the potential impact of cohesion policy, whereas econometric analyses measure the actual impact. The estimates from the first type of study are expected to be higher than the estimates of the second.

The differences are not necessarily inconsistent. Rather, the various results are complementary: the potential impact can be set against the actual impact. To bridge the gap is of course the challenge of future reform of cohesion policy. Chapter 6 comes back to this issue.

## CHAPTER 4

### NEW EVIDENCE ON COHESION POLICY AND CONVERGENCE

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The three types of evaluation – case studies, model simulations, and econometric analyses – all have their advantages and disadvantages. For the assessment of separate projects, case studies are appropriate. For the assessment of the impact of cohesion policy on growth however, they clearly have their shortcomings. Model simulations are well suited for ex-ante assessment, and econometric analyses lie in ex-post assessment of the impact of cohesion policy.

This Chapter adds to the relatively small number of existing econometric analyses. It is based on the most recent panel of regional data on cohesion policy and regional productivity. The method and scope resembles the ones used by other analyses. Time series information however, is exploited to estimate regional dummies. They control for region specific factors that determine distinct growth records. This is important for obtaining a clear picture of the impact of cohesion policy.

In addition, this Chapter provides an estimate of crowding out. With help of a unique database of national regional aid of various member states, an experiment is designed that gives an idea of the national regional aid that is typically being withdrawn once a region receives aid from Brussels.

#### 4.1. National convergence and cohesion policy

This section estimates the impact of cohesion policy on national economic growth. It follows Mankiw, Romer and Weil (1992) in adding exogenous labour-augmenting technological change to a system of a production and investment function. The steady-state level of GDP per capita is then determined by investment in physical and human capital and population growth. The distance between present GDP per capita and the steady state determines the growth rate of GDP per capita: the further an economy is below its steady state, the faster it will grow.

The model is extended further by the inclusion of the amount of cohesion support relative to GDP. A positive coefficient for this variable implies that cohesion policy gives an impulse to economic growth. The regression equation thus becomes:

$$\tilde{y}_{it} = \beta_1 + \beta_2 \ln y_{it-1} + \beta_3 \ln sk_{it} + \beta_4 \ln sh_{it} + \beta_5 \ln pop_{it} + \beta_6 \ln erdf_{it} + \beta_7 \ln open_{it} + \varepsilon_{it}$$

The variable  $y_{it}$  denotes GDP per capita, where  $i$  and  $t$  respectively index regions and 5-year periods. The dependent variable is growth of GDP per capita, and  $\tilde{y}_{it} \equiv \ln y_{it} - \ln y_{it-1}$ . Furthermore,  $sk_{it}$  stands for investment in physical capital,  $sh_{it}$  for investment in human capital,  $pop_{it}$  for population growth,  $erdf_{it}$  for ERDF cohesion support as a percentage of GDP and  $open_{it}$  for the openness of the economy, defined as the ratio of trade volume (the sum of imports and exports) and GDP. The reason why the latter variable is included is that openness might discipline governments<sup>16</sup>, and thus aid an efficient spending of cohesion support.

The data refer to the EU-12 (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom), and span the period 1960-95. Austria, Finland and Sweden joined too late to have any impact on the regression

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<sup>16</sup> Gallup and Sachs (1999) put forward that countries by the sea or countries with an infrastructure that is otherwise conducive to trade positively influence policy choices.

results. To avoid putting too much weight on an extreme investment rate in a certain year, five-year time intervals are considered. Thus, there are seven data points for each country.

Most data come from the World Bank; however, data for human capital are taken from De la Fuente and Doménech (2000). Furthermore, with respect to cohesion support, only the impact of the ERDF is considered. The reason is that this is the only fund for which reliable data for the entire panel are available.<sup>17</sup> This is less of a problem than it seems. Chapter 1 made clear that the ERDF is by far the most important fund. Moreover, its distribution is positively correlated to that of the rest of cohesion support.

Table 4.1 presents the results based on variations to the specification presented above. Consider first the results apart from the influence of cohesion policy (specification ‘basic’). They are consistent with the growth model: both types of investment raise growth, a rising population lowers GDP per capita and a lower initial level of income is associated with higher growth rates. Thus, all the parameters have the expected signs.

*Table 4.1. The impact of cohesion policy on national economic growth*

	Basic	ERDF	ERDF and open	(ERDF' open)
Constant	0.215 (0.063)	0.203 (0.063)	0.203 (0.059)	0.178 (0.059)
yt-1 (initial income)	-0.029 (0.005)	-0.030 (0.005)	-0.029 (0.005)	-0.026 (0.005)
sk (inv. in physical capital)	0.020 (0.009)	0.018 (0.009)	0.018 (0.010)	0.020 (0.008)
sh (inv. in human capital)	0.024 (0.012)	0.023 (0.012)	0.025 (0.013)	0.015 (0.011)
Pop (population growth)	-0.022 (0.022)	-0.029 (0.022)	-0.029 (0.021)	-0.033 (0.021)
ERDF (ERDF support)		-0.015 (0.008)	-0.015 (0.012)	-0.295 (0.076)
Open (openness of the economy)			-0.001 (0.004)	
ERDF×open (interaction)				0.067 (0.018)
R2-adj.	0.45	0.46	0.46	0.53
# panel obs.	91	91	91	91

*Note:* Standard errors between parentheses.

The results are, however, unfavourable for the advocates of cohesion policy: the specifications ‘ERDF’ and ‘ERDF and open’ strongly suggest that cohesion support has not improved the

<sup>17</sup> From 1986, we use data from the Commission accounting system (SINCOM). We are grateful to Rafael Doménech for making them available to us. Before 1986, we rely on Vanhove (1999) for ERDF data (original source: Official Journal of the EC).

growth performance of the beneficiaries. Worse still, the results point to a negative impact of cohesion support on the growth rate of real GDP per capita.

The success of cohesion proves to be conditional on openness as can be inferred from the specification ‘ERDF’ open’. In particular, an open economy like Ireland profits from support through the European Regional Development Fund, while a more closed economy like Spain does not gain at all. For less open economies, the results again suggest a negative impact of cohesion support on their growth performance. The specification ‘cohesion support and open’ is included to demonstrate that it is the combination of cohesion support and openness that works, rather than cohesion support or openness per se.

In short, it seems that cohesion support does not significantly contribute to national economic growth, unless recipient member states have open economies.

#### 4.2. Regional convergence and cohesion support

This Section estimates the impact of cohesion policy on regional economic growth. This is coherent with cohesion policy itself, which has a regional focus. The drawback of a regional analysis is that investment data for physical and human capital are unavailable. For this reason the specification differs somewhat from the previous one. In particular, a vector of dummies controls for fixed effects and thus make up for the loss of investment data. The regression equation is:

$$\tilde{y}_{it} = \beta_1 + \beta_2 \ln y_{it-1} + \beta_3 cs_{it} + \beta_4 D_i + \varepsilon_i$$

The variable  $y_{it}$  denotes GDP per capita, where  $i$  and  $t$  respectively index regions and years. The dependent variable is annual growth of GDP per capita, and by definition  $\tilde{y}_{it} \equiv \ln y_{it} - \ln y_{it-1}$ . Furthermore,  $cs_{it}$  stands for cohesion support, including the Structural Funds and the Cohesion Fund. In order to control for size differences between regions, it is expressed as a proportion of GDP. The vector  $D_i$  includes regional dummies that control for other factors than initial productivity and cohesion policy. Finally,  $\varepsilon_i$  denotes the error term.

There are three obvious choices for  $D_i$ : first, to exclude dummies altogether; second, to include country dummies; third, to include regional dummies. The advantage of the first choice is that it saves degrees of freedom and thus makes the estimators more efficient; however, it presupposes absolute convergence. It comes down to assuming that, as time goes to infinity, Ipeiros and Inner London will converge to the same level of productivity. The second choice makes convergence conditional on whether a region lies in a particular country. Thus, it allows for different steady states of productivity between Greece and the United Kingdom. It presupposes, however, that Ipeiros and Athens will become equally productive, as well as North-Humberland and Inner London. The third choice has the disadvantage that each dummy will have to be estimated on the basis of a few time series observations only. Hence one cannot put much confidence in the estimate of each region-specific effect separately. This does not disqualify the estimates  $\hat{\beta}_2$  and  $\hat{\beta}_3$  however, since errors cancel out across the board. The advantage of region dummies is that it allows persisting differences between productivity levels. Common sense tells us that Ipeiros may never catch up with either Athens or Inner London.

The panel includes data on cohesion support for 183 NUTS II regions between 1981 and 1996. They come from the European Commission (EC, 1997). Most support is directly attributable to the individual regions. Nevertheless, some funds and objectives – such as the Cohesion Funds and Objective 3 – are national by nature. Moreover, other funds are sometimes booked under a national header, even though they do go directly to the regions. Nevertheless, in either case the

funds are ultimately spent on regional projects. Thus, in order to come close to what regions actually receive, one must allocate these 'national' funds according to a particular formula. Here this is done in proportion to population. Of course, the institutional design of cohesion policy is taken into account. This means that Objective 1 funds are allocated to Objective 1 regions, Objective 2 funds to Objective 2 regions and so on. Furthermore, it is assumed that within each planning period the support is evenly spread over the individual years.

The GDP per capita data come from the 1979 European System of Accounting (ESA). They run from 1981-96.<sup>18</sup> Purchasing power parities control for price differences between member states. Unfortunately, they are unavailable for NUTS II regions. Since prices tend to be higher in richer regions the data tend to overstate welfare differences somewhat. The EC however, uses exactly the same data as a key for eligibility for Objective 1. EUROSTAT provides the population data. This introduces some degree of collinearity between GDP per capita and cohesion support. Nevertheless, there is enough independent variation to be able to estimate the corresponding coefficients.

Table 4.2 shows the results of the three specifications of the regression: no dummies, country specific dummies and region specific dummies. Statistical significance at the 5% level is indicated by an asterisk. The numbers in parentheses are the standard errors. The results in Table 4.2 suggest that there is convergence in all specifications. Indeed, the rate of convergence ranges from 3.7% in case of absolute convergence to 4.5% in case of convergence to country steady states, and 6.6% in case of regional steady states.

The cohesion support parameter differs between the three specifications. The first specification without dummies corresponds, from the perspective of equality, to the positive view that poor regions will in the long run catch up with rich regions. The snag here is that the results suggest that cohesion support has a negative impact on economic growth. This is conceivable in case of excessive crowding out and rent-seeking. Imposing absolute convergence however, while there is in fact only conditional convergence, creates a downward bias for the estimate of the impact of cohesion support. The reason is that its parameter must somehow correct for the differences in steady states that actually exist but are not accounted for. It goes up for relatively high steady states, and down for relatively low ones. Since poor regions tend to have relatively low steady states as well as receive relatively much cohesion support, the bias is downward. In other words, by assuming that Ipeiros will ultimately converge to Inner London, one simply expects too much from this region. This has negative repercussions for estimating the impact of cohesion support on the economic growth of this region. This might explain the negative estimate.

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<sup>18</sup> Data for later years are only published in accordance with the in 1995 revised accounting system. Because these different definitions lead to substantial differences at the regional level, the former system is used exclusively. The first year of data availability differs between the regions, but for most of the regions data are available from 1981.

Table 4.2 The impact of cohesion policy on economic growth

	Absolute convergence	Country-specific steady states	Region-specific steady states
Constant	0.66* (0.030)	Highest: 0.83 (Luxembourg) Lowest: 0.77 (Greece)	Highest: 1.19 (Thüringen) Lowest: 1.06 (Ipeiros)
yi,t-1	-0.037* (0.002)	-0.045* (0.002)	-0.066* (0.003)
cs	-0.35* (0.110)	0.02 (0.130)	0.70* (0.170)
S.E.	0.039	0.038	0.037
# panel	2359	2359	2359
R2 adj	0.13	0.16	0.19

Standard errors in parentheses.

Notes: \* indicates statistical significance at the 5% level.

The second specification with country dummies corresponds to the intermediate position that regions converge within, but not between countries. Then the estimated impact becomes negligible and insignificant. The third specification corresponds to the negative view that the poor may never catch up with the rich. Only then there is a positive and significant estimate of 0.7. It says that an additional amount of cohesion support equivalent to 1% of GDP induces an additional annual growth of GDP per capita of 0.7%.

In short, the results indicate a clear trade off: the more optimistic one is about convergence in the long run, the more pessimistic one should be about the impact of cohesion policy, and vice versa. After all, in a world of absolute convergence, cohesion support has a negative impact on economic growth. In a world of conditional convergence with country-specific effects – the intermediate position – cohesion policy has a negligible and insignificant impact. Finally, only in a world of conditional convergence with region-specific effects does cohesion policy help poor regions forward. The somewhat grim conclusion must be that either cohesion policy is counterproductive or that regional differences will persist. One cannot have the best of both worlds. This does not imply that one should do away with cohesion policy, or conversely, increase the effort. It merely implies that one cannot be overly optimistic.

### 4.3. Crowding out

Two of the three estimates suggest that the impact of cohesion policy on economic growth of lagging regions is negligible or even negative. Crowding out of national regional policy is often blamed for the alleged lack of effectiveness. It seriously undermines the impact of cohesion policy. If member states withdraw their own funds from lagging regions once they receive support from Brussels, then cohesion policy sets the cart before the horse. The EC recognises the danger since it requires ‘additionality’, i.e. co-funding from national governments. Moreover, additionality gives governments an incentive to avoid ‘nonsense’ projects that fail to yield any return.

Opinions about the extent of the crowding out differ considerably. In model simulations cohesion support typically translates directly into productive public investment. This boils down to zero crowding out. By contrast, case studies often suggest substantial crowding out. The truth lies probably somewhere in between. Unfortunately, researchers grope in the dark with respect to the extent to which crowding out constitutes a problem. Garcia-Mila and McGuire (2001)

provide some suggestive evidence for Spain. They show that the trends of national and European regional policy are almost mirror images. Unfortunately, they have only a few data points for just one country; therefore, a firm conclusion cannot be drawn. De La Fuente and Givès (1995) illustrate the degree of ignorance by imposing exogenous lower and upper bounds of crowding out on their model. This is of course a sensible strategy. Nevertheless, it would have been better to insert an estimate of crowding out, had that been available. This Section contains the first attempt to obtain such an estimate.

In order to estimate crowding out one needs information concerning which regions would have received in national aid in the absence of cohesion support. The strategy is to divide the regions in the sample into two groups: relatively poor regions that are eligible for Objective 1 support, and relatively rich regions that are ineligible for Objective 1 support. The basic idea is one of a natural experiment. The relatively rich regions constitute the ‘control group’ as they receive little cohesion support. The relatively poor regions are the ‘treatment group’ as they receive a lot. The relation between national aid and the relative poverty of a region is estimated on the basis of the control group only. In this manner one can have a crack at what regions in the treatment group should have received. What remains to be done is to compare this with what they actually received. The difference must be due to crowding out.

The following regression equation specifies the idea:

$$NAT_i = \beta_1 MS_i + (\beta_2 + \beta_3 OB I_i) RP_i + \varepsilon_i$$

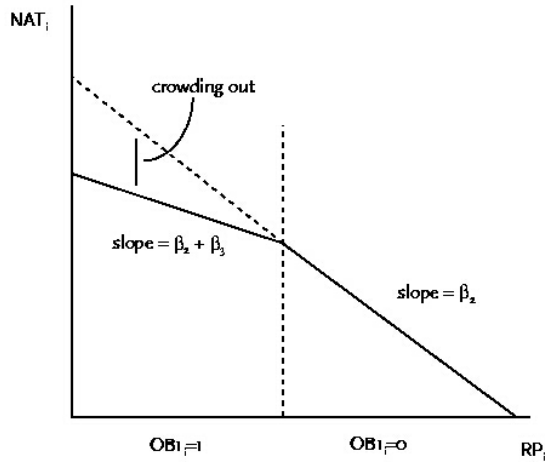
Where  $NAT_i$  denotes national regional aid per capita for region  $i$ .  $MS_i$  is a member state dummy, and  $OB I_i$  an Objective 1 dummy that takes the value 1 when region  $i$  is in the treatment group and 0 if it is not.  $RP_i$  denotes the relative productivity, i.e. the ratio of GDP per capita of region  $i$  and the GDP per capita of the member state to which it belongs. Finally,  $\varepsilon_i$  is an error term.

The member state dummy controls for country-fixed effects. The coefficient  $\beta_1$  thus picks up all aspects that influence regional aid by the member state, such as the state budget and preferences for redistribution. Furthermore, it is to be expected that the richer a region is relative to the national average the less national regional aid it receives. Hence, we expect a negative sign for the parameter  $\beta_2$ . If there is crowding out however, regions in the treatment group will receive less national regional aid than what is to be expected on the basis of what is observed in the control group. This materialises as a positive sign for the parameter  $\beta_3$ .

Figure 4.1 corresponds to the regression equation. National regional support per capita is depicted on the vertical axis, and regional GDP per capita relative to the national mean is depicted on the horizontal axis. The downward sloping line refers to the notion that richer or more productive regions should receive less national regional support. There is a break point at the dividing line between the treatment group of Objective 1 regions and the control group of non-Objective 1 regions. The richer is a member state, the closer this dividing line lies to the origin. Whatever its position, the break point indicates that Objective 1 regions get less national support than what is to be expected on the basis of the support for non-Objective 1 regions. In particular, the vertical difference between the dotted line – the estimate of what Objective 1 regions should have received – and the solid line – the observation of what they actually receive – is what Objective 1 regions forgo. Equivalently, the difference between the slopes of both lines is of what they forgo at the margin. The latter difference corresponds to the value of the parameter  $\beta_3$ . Thus, a Chow breakpoint test – here a simple t-test on  $\beta_3$  – suffices to determine whether there is crowding out.



Figure 4.1. Measuring crowding out



Before delving into the regression results a few notes on the data are in place. A major obstacle to this type of analysis used to be that there was no data set of national regional policy for the EU as a whole. Martin (1999b) however, recently compiled such a data set from various regional and national sources. It contains national regional support for 80 NUTS II regions for the period 1989-93.<sup>19</sup> This level of disaggregation is convenient for the problem at hand since a large part of cohesion policy also refers to the same NUTS II regions. Moreover, the time interval coincides with the first planning period following the Single European Act, the effective start of cohesion policy in its present form. Regional GDP per capita and Objective 1 support are available from Eurostat and the EC (1997).

An eyeball analysis reveals that the data are consistent with common sense. Relatively poor regions within richer member states receive more than their counterparts in poorer member states. This underlines the importance of the country dummies. Furthermore, poorer regions within each member state indeed tend to receive more regional aid from their national governments. In particular, the Objective 1 regions in all but one member state receive several times more national aid than non-Objective 1 regions. The exception is Italy, where the reverse is true. This is, however, entirely due to a single large project in Lazio. For this reason we exclude this region from the sample. The question remains whether these regions would have received more in the absence of cohesion support.

<sup>19</sup> There is one observation per region.

Table 4.3. *Measuring crowding out*

Variable	Coefficient	S.E.
RP ( $\beta_2$ , redistribution)	-311.1**	93.3
RP-OB1 ( $\beta_3$ , crowding out)	155.3*	83.2
Adjusted R2		0.43
# obs.		67

Note: \*\* (\*) statistically significant at 5% (10%) level.

This question is answered in the affirmative. OLS estimation of the regression equation reveals that the parameters of interest have the expected sign and are statistically significant at the 10% level. Thus, the null of no crowding out may be rejected. Table 4.3 lists the results. Recall that different slopes of the regression lines at either side of the break point represent marginal crowding out. The absolute value of the ratio of  $\beta_3$  and  $\beta_2$  equals approximately 0.50. This means that, on average, for a given decrease in  $RP_i$  (i.e. regional GDP per capita relative to national GDP per capita)  $NAT_i$  (i.e. national regional support) increases by only 50% of what it would have done had the region not been eligible for Objective 1 support. In other words, a poorer region forgoes 50% of additional national regional support due to cohesion policy.

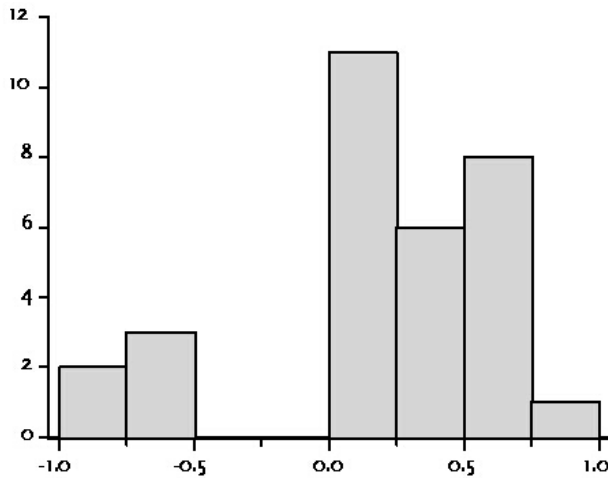
This is a considerable degree of crowding out by any standard. It does not mean that 50% of cohesion support is wasted. In order to know how many cents of national regional support is crowded out by €1 of cohesion support one needs additional information and assumptions. In particular, dividing the amount of national regional support forgone – which can be obtained on the basis of the regression results – by the total amount of cohesion support for the Objective 1 regions, gives average crowding out. This equals marginal crowding out only if the withdrawal of national regional support is directly proportional to cohesion support. Average crowding out may be smaller as well as larger. In fact, it may exceed one. In that case, cohesion policy would perversely reduce the funds for lagging regions, and thus cohesion policy would, contrary to its intention, thwart convergence of productivity between the European regions.

For each of the 31 Objective 1 regions in the sample it is possible to calculate the difference between what it should have received in national regional support per capita, and what it actually received. Dividing this by cohesion support per capita,  $CS_i$ , gives the average crowding out,  $CO_i$ :

$$CO_i = \frac{\hat{\beta}_1 MS_i + \hat{\beta}_2 RP_i - NAT_i}{CS_i}$$

Figure 4.2 depicts the distribution of this statistic.

Figure 4.2 Distribution of the crowding out statistic



The distribution ranges from -0.95 to 0.75. The one extreme corresponds to almost perfect compliance to the European Commission's co-funding requirement, the other to almost perfect crowding out. The mean is 0.17. It says that €1 of cohesion support typically crowds out €0.17 of national regional policy, in spite of the co-funding requirement. Accordingly, this diminishes the effectiveness of cohesion policy.

#### 4.4. Conclusions

Additional econometric research on the impact of cohesion policy on convergence, or, to be precise, the impact of cohesion policy on economic growth of lagging member states and regions, yields mixed evidence. Cohesion support fosters economic growth of lagging member states conditional on the openness of the economy. In particular, cohesion support is more likely to be effective for open member states, and less likely to be effective in closed ones. A tentative explanation for this finding is that openness disciplines governments, which may in turn stimulate more productive investment of cohesion support.

The estimated impact of cohesion policy on the economic growth of lagging regions is substantial if one presupposes that each region grows towards its own steady state level of GDP per capita. The estimated impact is, however, negligible or even negative if one presupposes that regions within one member state, respectively within the EU, will converge to the same steady state level of GDP per capita. This clearly constitutes a trade-off. The more negative one is about convergence, the less effective cohesion policy appears to be, and vice versa.

Finally, crowding out of national regional aid, often blamed for the alleged lack of effectiveness of cohesion policy, is estimated to be significant. At the margin, a region typically forgoes 50% of national regional aid once it becomes eligible for Objective 1 support. This boils down to an average crowding out of €0.17 of cohesion support per €1 of cohesion policy.

## CHAPTER 5

### A SYNTHESIS OF EMPIRICAL FINDINGS

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This chapter summarises the findings of the various studies on the impact of cohesion policy on convergence that are reviewed in Chapter 3, as well as the further evidence presented in chapter 4. In particular, it brings all the estimates on a common denominator. It thus builds a sample of ‘impact elasticities’ that serves as the basis for a crude meta-analysis.

#### 5.1. The impact elasticity of cohesion support

How do the estimates of the impact of Structural Funds add up? This question is difficult to answer by a simple scan of the studies in this review. First of all, some studies focus on productivity, while others focus on employment. This chapter confines, however, the review to the impact of cohesion policy on productivity growth. But even then, some studies explore the impact on annual growth rates, while others look at differences between levels over a certain time span. Another problem is that the impact of cohesion policy sometimes refers to regions, sometimes to countries, and yet other times to certain sets of regions and countries. Moreover, to compare the various studies, one not only needs the impact of cohesion policy on growth, but also the amount of cohesion support dedicated to achieving this growth.

For the sake of comparability the results of the distinct studies are transformed into a single statistic. In particular, whenever possible, we calculate an ‘impact elasticity’

$$\frac{d\hat{y}}{\left(\frac{CS}{GDP}\right)}$$

where  $d\hat{y}$  represents the increase of the annual growth rate of GDP per capita that is attributable to cohesion policy,  $CS$  the amount of cohesion support, and  $GDP$  the gross domestic product of the respective region, group of regions, Member State, or group of Member States. Thus, the statistic measures ‘additional growth per unit of cohesion support’, indeed the information upon which cohesion policy should be judged. For example, Goybet and Bertoldi (1994) report that, on average, the GDP per capita in objective 1 regions grew annually over the 1989-1993 period with 3.0% instead of the 2.6% in the base line scenario. The growth attributable to the Structural Funds is thus  $3.0-2.6=0.4\%$ . EC data reveal that the cohesion support to this set of regions amounted to 1.33% of their joint GDP. Thus, the elasticity equals  $0.4/1.33=0.3$ .

#### 5.2. The sample

Table 5.1 (on the next page) displays the growth elasticity of cohesion support for all studies for which it was possible to calculate it.

Overall, there are 46 elasticities, including the three estimates of chapter 4. The rows list the studies in chronological order, with a distinction between model simulations and econometric studies; the columns list the Member State to which the studies correspond. These are either Greece, Ireland, Portugal and Spain, or a catch-all category ‘other’ which mostly refers to fairly large subsets of NUTS II regions.

Table 5.1 Growth elasticity of cohesion support

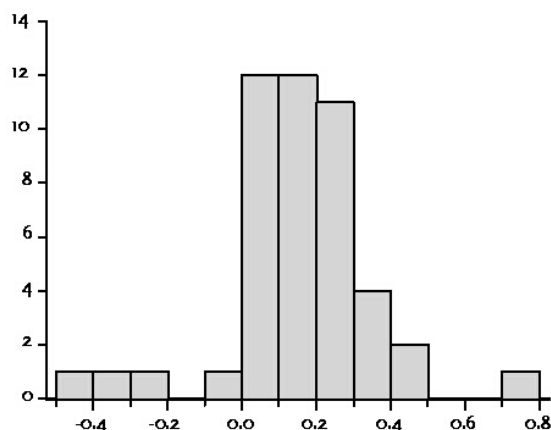
Model simulations		Greece	Ireland	Portugal	Spain	Other
Lolos and Zonzilos (1994)		0.33a				
Goybet and Bertoldi (1994)						0.30b
Bradley (1995)			0.03			
Lolos, Suwa-Eisenmann and Zonzilos (1995)		0.01				
Bradley, Herce and Modesto (1995)			0.18	0.11	0.3	
Christodoulakis and Kalvytis (1998)		0.15				
Christodoulakis and Kalvytis (1998)		0.12				
Christodoulakis and Kalvytis (2000)		0.15				
Hallet (2000)						0.1
European Commission (1999d)c		0.15	0.24	0.24		
European Commission (1999d)d		0.24	0.43	0.28	0.27	
European Commission (1999d)e		0.29	0.29	0.34	0.45	
European Commission (1999d)f		0.09	0.14	0.09	0.09	
European Commission (1999d)g		0.03	0.14	0.06	0.09	
Pereira (1999)		0.15	0.06	0.1	0.13	
Pereira and Gaspar (1999)				0.2		
Mean elasticity model simulations	0.18					
<b>Econometric analyses</b>						
Fagerberg and Verspagen (1996)						-0.23
Fagerberg and Verspagen (1996)						-0.42
Cappelen, Castellaci, Fagerberg and Verspagen (2001)						0.21
Cappelen, Castellaci, Fagerberg and Verspagen (2001)h						0.25
Cappelen, Castellaci, Fagerberg and Verspagen (2001)						-0.03
Garcia-Solanes and Maria-Dolores (2001)						0.2
Garcia-Solanes and Maria-Dolores (2001)						0.04
Garcia-Mila and McGuire (2001)					0.07	
Ederveen, Gorter, De Mooij and Nahujs (2002)						-0.35
Ederveen, Gorter, De Mooij and Nahujs (2002)i						0.02

Ederveen, Gorter, De Mooij and Nahuis (2002) <sup>j</sup>							0.7
Mean elasticity econometric analyses							0
Mean elasticities Member States			0.16	0.19	0.18	0.2	0.07
Mean elasticity overall							0.15

<sup>a</sup> Average of lower bound 0.25 and upper bound 0.40; <sup>b</sup> Includes only objective 1 support; <sup>c</sup> Pereira; <sup>d</sup> Beutel 89-93; <sup>e</sup> Beutel 94-99; <sup>f</sup> QUEST II, 89-93; <sup>g</sup> QUEST II, 94-99; <sup>h</sup> Including the time slope dummy; <sup>i</sup> With country specific dummies; <sup>j</sup> With region specific dummies

Figure 5.1 displays the distribution of the elasticities. It ranges from -0.42 to 0.70, indicating the wide variation of results. The mean as well as the median equal 0.15. Hence, a crude summary of the studies suggests that annual growth rate increases by 0.15 percentage points if the EU injects Structural Funds equal to one percent of GDP.

*Figure 5.1 Distribution of impact elasticity of cohesion support*



### 5.3. A meta-analysis

The variation of the impact elasticities may be explained by the characteristics of the underlying studies. In order to explore whether there exists a systematic relation between the elasticity and characteristics of the underlying study, one can do a meta-analysis. In particular, if one regresses the elasticity on dummies that indicate whether a study focuses on Greece, Ireland, Portugal Spain or another geographical entity, and whether a study is model simulation or an econometric analysis, then a more refined picture of the growth impact of cohesion support emerges.

Table 5.2 displays the regression results of the meta-analysis. The second column refers to a specification with Member State dummies. The constant is the estimated elasticity for econometric analyses focussing on other geographical entities than Greece, Ireland, Portugal or Spain. Its value is approximately 0.04, considerably lower than the mean 0.15 found for the entire sample. The coefficients for Greece, Ireland and Portugal are all negative. Thus, relative to 'other', which can be interpreted roughly as a European average, cohesion support appears to lead to slightly less growth in these Member States. This is surprising since Ireland's successful growth record is sometimes

attributed to efficient spending of cohesion support. The coefficient for Spain is positive. Thus, for this country the reverse holds true. Finally, the coefficient for the model simulation dummy has a value of almost 0.16. This suggests that almost all the positive growth impact of cohesion support is generated by this type of study.

*Table 5.2 Regression results*

Variable	Member State dummies	Non-member dummies	State
Constant	0.040 (0.057)	0.042 (0.054)	
Model Simulation	0.158 (0.117)	0.140* (0.062)	
Greece	-0.042 (0.125)		-
Ireland	-0.009 (0.130)		-
Portugal	-0.025 (0.120)		-
Spain	0.025 (0.120)		-
# obs	46		46
Adj. R2	0.006		0.084

\* Significant at the 5% level; standard errors in parentheses.

The standard errors show that none of the coefficients is statistically significant. This lack of significance is, however, spurious, as collinearity is to blame. A glance at table 5.2 makes this clear: almost none of the model simulations and almost all of the econometric studies fall under the category 'other'. There is thus insufficient independent variation of the variables to warrant confidence about the estimates.

This is exemplified by a second regression in which the Member State dummies are left out. The second column lists the results. The constant is equal to the mean elasticity of econometric analysis reported. Note that it is both small and statistically insignificant. Thus, econometric analyses typically attribute no growth impact to cohesion support. The coefficient for model simulations is both substantial and statistically significant at the five percent level. Thus, model simulations typically attribute a relatively large impact to cohesion support.

How can the difference between the results of both types of studies be reconciled? Model simulations typically presuppose that all cohesion support translates directly into productive public investment. The analysis in Chapter 4 showed, however, that cohesion support crowds out national regional aid. Moreover rent seeking by regional and national authorities, may decrease the effectivity of cohesion support even further. Econometric analyses, by directly relating growth performance to cohesion support, take these factors implicitly into account. Thus, the results of model simulations are most naturally interpreted as the potential growth impact of cohesion support, while the results of econometric analyses refer to the actual impact.

The gap between the potential and the actual impact is large: the first is no less than 4.5 times larger than the second. There is therefore a lot to gain from a more efficient design of cohesion support. This constitutes the challenge for future cohesion policy

#### **5.4. Conclusions**

Cohesion support has the potential to encourage convergence across regions. This is clearly illustrated by various model simulations, either carried out within the EC or by outside researchers. However, Structural Funds and the Cohesion Fund are not necessarily effective in this respect. Indeed, there are several possible caveats that may reduce the growth effect of cohesion support, such as crowding out, inappropriate spending, and rent seeking. Although the EC tries to minimise these adverse unfavourable by-products of cohesion support, ex-post evaluations should say how effective it really is in stimulating economic convergence across regions. On the basis of various case studies on the impact of Structural Funds on growth, it is hard to make an objective quantitative assessment. The evidence from econometric studies is mixed: some studies report a positive, some an insignificant, a some even a negative impact of Structural Funds.

Meta-analysis reveals that the potential growth elasticity of cohesion support is 0.18. Model simulations on average suggest that an amount of cohesion support equal to one percent of GDP yields 0.18 additional percentage points in annual growth of GDP per capita. Meta-analysis also reveals, however, that the actual growth elasticity from econometric studies is a mere 0.04, almost five times smaller. The challenge is thus to reform cohesion policy such that this gap is bridged.



## CHAPTER 6

### THE FUTURE OF COHESION POLICY

The enlargement of the EU will cause an expansion of the European cohesion budget under the present institutional design. Who is going to pay for this? And does it call for reform? To structure the thinking about these questions, this Chapter discusses a number of dilemmas in cohesion policy. It also elaborates on how enlargement affects these dilemmas and thus serves as guide for thinking about future reforms.

#### 6.1. Cohesion policy in light of enlargement

In the coming decade, the EU will enlarge with ten Central and Eastern European Countries (CEECs) as well as the island states Cyprus and Malta.<sup>20</sup> This enlargement has important implications for European cohesion policy. In particular, the budget will expand, the distribution of funds will change and cohesion policy will face new challenges with respect to convergence.

#### EU enlargement

Table 6.1 indicates the total size of the enlargement in terms of population and GDP. From it, we see that enlargement involves an expansion in the EU population of 28%, exceeding the size of all previous enlargements of the EU. Total GDP in the EU will increase by only 4% (measured at exchange rates). This is comparable to the size of the Dutch economy. Hence, the enlargement is more modest in economic terms than it is in terms of population. The third column of Table 6.1 reveals that the average per capita income in the accession countries in 1999, measured in PPP's, is 38% of the EU-15 average. Most of the accession countries also suffer from high unemployment rates, as we see in the last column of Table 6.1. On average, this rate is 10.4%.

*Table 6.1. Economic indicators of accession countries (Figures 2000)*

	GDP in billions of euro	Population in millions	GDP p.c. (EU15=100) <sup>a</sup>	Unemployment rate
Poland	171	38.7	39	16.3
Romania	40	22.5	23	7.0
Czech Republic	55	10.3	59	8.8
Hungary	50	10.1	50	6.6
Bulgaria	13	8.2	27	16.2
Slovak Republic	21	5.4	48	19.1
Lithuania	12	3.7	33	15.6
Latvia	8	2.4	29	14.2
Slovenia	20	2.0	68	6.9
Estonia	6	1.4	37	13.2
Cyprus	10	0.8	85	4.9
Malta	4	0.4	55	6.5
Total	410	105.9	38	10.4
EU-15	8526	375.3		8.2
Accession in % EU-15	4.8	28.2		

<sup>a</sup> Measured in PPP, Figures for 1999

Source: Eurostat (2000; 2001)

<sup>20</sup> With Turkey, another candidate country, negotiations have not started yet.

Among the twelve accession countries, we observe substantial variation. Table 6.1 shows that Poland and Romania are by far the largest countries in terms of population (38.7 and 22.5 million, respectively). The Baltic States, Slovenia, Cyprus and Malta are relatively small: together these six countries cover 10.7 million people, i.e. around a quarter of the population of Poland. Regarding welfare, Table 6.1 reveals that Cyprus and Slovenia are the richest countries with an income per capita of 85% and 68% of the EU average, respectively. In Romania and Bulgaria, income per capita is less than 30% of the EU-average. The unemployment rate ranges from 7% in Hungary to more than 19% in Slovakia.

There are not only differences between countries, but also between regions within countries (Behrens, 2001ab). For instance, some regions in Bulgaria and Romania have an income per capita that is approximately 20% of the EU-average, while the Figures for the areas around Prague and Bratislava are 124% and 95%, respectively. Similarly, the unemployment rate ranges from 23.7% in Yugoiztochen (Bulgaria) to 3.2% in Prague (Czech Republic).

### **Expansion of the cohesion budget**

Under the current rules, all accession countries will qualify for support from the Cohesion Fund and most of their regions for support from Objective 1 of the Structural Funds. Enlargement is therefore likely to cause an expansion of the EU cohesion budget. A Dutch committee has recently explored the budgetary implications of enlargement (IBO, 2001). In the current planning period 2000-06, the total cohesion budget is €252 billion, €39 billion of which is reserved for the accession countries. Table 7.2 shows the expected budget in the 2007-13 period according to the current cohesion policy rules applied in an enlarged EU. We see that the accession countries are expected to receive a total amount of €160 billion from the Structural Funds and €26 billion from the Cohesion Fund (in prices 1999). The total amount of support for the accession countries would thus rise from €39 to €186 billion.<sup>21</sup>

EU-enlargement will, however, also induce some endogenous savings to the cohesion budget. This is because accession of relatively poor countries pulls down the average per capita income in the EU by around 16%.<sup>22</sup> As a result, Ireland and Spain would no longer be eligible for the Cohesion Fund for the period 2007-13 since their GDP per capita would exceed 90% of the average in the enlarged EU.<sup>23</sup> This saves €12 billion on the Cohesion Fund. Furthermore, a large number of regions in the current EU will no longer be eligible for Objective 1 support of the Structural Funds because their GDP per capita would exceed 75% of the EU average. This saves around €47 billion on the Structural Funds, primarily from regions in southern Europe. On balance, the total

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<sup>21</sup> Here, we have not imposed the cap of 4% of GDP on the maximum cohesion support per country. Applying this cap would mitigate the expansion of the budget. In particular, IBO (2001) reports that the difference is €40 billion.

<sup>22</sup> Negotiations on the new planning period 2007-13 will probably be based on data for 2004. If the growth rate in per capita income in the CEECs is higher than in the EU-15 until 2004, the EU-average will fall by less than 16%. Indeed, Pelkmans et al. (2000) estimate this decline at 7% in case the growth rate in the CEECs is 2% higher than in the EU.

<sup>23</sup> For Ireland, this is also the case in the absence of enlargement.

cohesion budget would thus rise € 88 billion to a total of €340 billion, i.e. an increase in the budget by 34%.<sup>24</sup>

This expansion of the cohesion budget is less than 0.2% of the EU's GDP and will keep the total EU-budget below its upper limit of 1.27% of the EU's GDP. Nevertheless, the expansion may cause political frictions. The major problems will arise from the distributional implications: which member states are going to pay for the increase in the cohesion budget? And will southern EU countries accept the substantial reduction in cohesion support due to the enlargement?

*Table 6.2. Estimates of the cohesion budget in an enlarged EU  
(in billions of euro, measured in prices 1999)<sup>a</sup>*

<i>Budget 2000-06</i>	<i>Budget 2007-13</i>	
Structural Funds to EU-15	195	148
Cohesion Fund to EU-15	18	6
Structural Funds to new members	39	160
Cohesion Fund to new members		26
Total Cohesion Budget	252	340

<sup>a</sup> Based on data for 1999. In the calculations, the current cohesion policy rules are applied, except that there is no 4% cap on the maximum amount of support per country.

Source: IBO (2001).

### **New challenges with respect to convergence**

Apart from political problems regarding the budget, EU enlargement will also bring new challenges for the EU to reduce the income disparities between the current member states and the CEECs. The last decade is not characterised by a convergence process. Indeed, Table 6.3 (on the next page) reveals that, during 1989-99, EU GDP per capita grew by 22% while the CEEC's real GDP in 1999 is no higher than in 1989. Hence, the first decade of transition is characterised by a divergence in income levels between the EU and the CEECs. The exception is Poland where the average growth rate during the last decade is more or less equal to that of the EU.

Comparing the first and second columns in Table 6.3, we see that there is an enormous difference between the first five years of transition and the last five years. In particular, after a sharp fall in GDP in the early years of transition, the CEECs have now, on average, returned to their pre-transition level of welfare. During the last five years, the average growth rate in the accession countries was 3.6% per year. Poland and Slovakia even grew by an annual rate of almost 6%. Compared to the annual growth rate of 2.4% in the EU, these Figures suggest that accession countries have reached a phase of convergence towards the EU-15. This does not hold for all countries however. For instance, Bulgaria and Romania experienced a decline in GDP during the last five years. The Czech Republic also features a poor track record.

<sup>24</sup> EC (2001) foresees a somewhat higher cohesion budget of €360 billion for 2007-13.

To converge to the average EU level in the coming years, the CEECs need to grow substantially faster than the EU. In particular, if the difference in growth rates would remain 1.2% annually, i.e. the average over the past five years, it would take 83 years before the accession countries have moved towards the average EU-15 level. This is long by any standard. If CEECs would aim to converge at a faster rate, for instance within a period of 20 years, this would require an annual growth rate of at least 7% per year.<sup>25</sup> Hence, catching up of the CEECs requires a formidable effort.

*Table 6.3 Convergence and divergence between the CEECs and the EU between 1989-99*

Real GDP in 1999 (1989=100)	Average growth rate 1994-99	
Poland	122.0	5.8
Romania	73.7	-1.4
Czech Republic	95.1	1.6
Hungary	99.6	3.4
Bulgaria	70.7	-1.8
Slovak Republic	103.3	5.6
Lithuania	63.5	3.2
Latvia	59.4	2.9
Slovenia	105.3	4.2
Estonia	78.5	4.3
Mean CEECs	100	3.6
EU-15	122	2.4

*Source:* Boeri et al. (2000), Eurostat (2001) and own calculations.

Several factors might contribute to the convergence of accession countries to the EU average, including market integration, domestic reform and EU policies. Regarding the first component, one may think of trade integration, inflows of FDI and the associated technology transfers, free mobility of labour and increasing competitive forces from the EU. Model simulations by CPB suggest that these factors will indeed cause an increase in the growth rate in accession countries of around 0.7% per year during the next two decades (Lejour et al., 2001). Second, ongoing transition may stimulate growth (Bos et al., 1999). For instance, a further development of government and legal institutions in the CEECs, including the administrative capacity, may enhance trust and certainty with respect to property rights (Knack and Keefer, 1997). Moreover, the creation of a civil society with appropriate coordination mechanisms, structural reform in many sectors and investments in human capital, will contribute to economic growth. The final factor that may enhance growth in the CEECs is transfers. The current rules imply that a country can receive a maximum amount of cohesion support of 4% of its GDP.

<sup>25</sup> Here we have assumed a growth rate in the EU of 2% per year, i.e.  $(1.02)^{20} = 0.38 \times (1.07)^{20}$

Applying an average growth elasticity of cohesion support of 0.18, which is the average for simulation studies in Chapter 5 of this report, we find that cohesion policy can potentially boost the growth rate in the CEECs by an additional 0.7% per year.

Although there is certainly a potential for convergence, it is not straightforward that this will actually take place. Indeed, economic growth may be reduced by several factors. For instance, a lack of political support for reform in the CEECs may hamper the domestic engines for convergence. Moreover, there may be adjustment costs associated with the adoption of the *acquis communautaire*. To illustrate, substantial financial means will be necessary to comply with EU rules for the internal market, the environment and cooperation with EU countries in Justice and Home Affairs (WRR, 2001).

## **6.2. Dilemmas in reforming cohesion policy**

EU-enlargement will probably call for reform of cohesion policy, both because of the political frictions associated with the budgetary implications, and because of the new challenges regarding convergence in an enlarged EU. In thinking about reform, policy-makers typically face dilemmas. This Section discusses six of them.

### **Equity versus efficiency**

Current cohesion policy provides funds to all member states and regions in the EU, both poor and rich. In particular, more than 40% of all funds flow to countries with a welfare level that exceeds the EU-average. This can potentially be justified on the basis of subsidiarity. For instance, national governments could fail to incorporate international spillover effects of decentralised national policy making. Community intervention would then be efficient. As we discussed in Chapter 1, this type of coordination failure is, however, typically not the motivation for the majority of Structural Funds and the Cohesion Fund. Indeed, the main objective of European cohesion policy is to reduce welfare differences among regions. Hence, equity rather than efficiency should govern the allocation of funds. Given that a large share of funds flows to relatively rich countries, there is scope for improving redistributive efficiency, i.e. the extent to which cohesion policy redistributes between rich and poor.

### **Redistributive efficiency versus political feasibility**

As cohesion policy is explicitly motivated by redistribution, it is somewhat peculiar to observe that rich countries and also rich regions receive funds. This is because of political reasons. In particular, from previous negotiation rounds we learn that the budget for cohesion support expands with each new planning period and each enlargement of the EU. Apparently, the amount of support a country receives constitutes the minimal outcome for the next negotiation round. This is referred to as plateau-effects (Peacock and Wiseman, 1961). The discretionary approach to the distribution of funds thus increases the political feasibility of cohesion policy.

Serving political feasibility, however, comes at a cost. For one thing, successive expansions of the cohesion budget might, somewhat paradoxically, ultimately erode public support for cohesion policy and its aims regarding the solidarity among nations. For another thing, linking the design of cohesion policy to the net fiscal position of countries can seriously reduce the effectiveness of cohesion policy in achieving its goal

of convergence. Indeed, discretionary bargaining tends to be the main reason for the limited redistributive efficiency.

Effective cohesion policy calls for rules rather than discretion: rules based on principles that are consistent with the objective of redistribution. In principle, these rules should not be subject to negotiations when countries determine the cohesion budget for the next planning period. It would imply that cohesion policy is a temporary matter and stops once a region has converged sufficiently to the average welfare level in the EU.

Discretion can be justified only to the extent that cohesion policy is a lubricant in the political bargaining process over the net fiscal position of countries. In that case, a system of net fiscal transfers would suffice (see below) and the size of the total cohesion budget could be reduced substantially.

### **Regional versus national redistribution**

The convergence objective of cohesion policy is defined on a regional basis. This raises the question: Why? For instance, why should the EU be concerned with the reduction of regional disparities in rich countries, i.e. countries that are also the main contributors to the cohesion budget? One reason could perhaps be that the EU is able to overcome political deadlock at the national level with respect to regional policy. Hence, government failure at the national level would then justify intervention by the EU. In general however, it tends to be inefficient that the EU collects funds from rich nations and then returns these funds back to lagging regions in the same nations. Moreover, public choice theory suggests that government failures at the more centralised level are typically larger than at the decentralised level.

A national approach to convergence is more natural and has three additional advantages compared to a regional approach. First, the national approach is more effective in reducing income disparities between member states (vertical equity). Indeed, we observe that a substantial amount of funds is currently provided to poor regions in rich member states. Second, the national approach may be regarded as more fair by nations since the regional approach violates the principle of horizontal equity. In particular, countries that avoid regional disparities on the national level receive less support than countries with the same level of welfare but with larger regional disparities. Finally, national support avoids crowding out which is an important problem under the regional approach. Indeed, national governments reduce their financial support to their lagging regions in response to the funds provided by the EU. The estimates in Section 3.3 of this report suggest that for each €1 provided by the EU to a region, its national government withdraws €0.17 from that region. Crowding out reduces the effectiveness of the regional approach at the EU level.

### **Planning versus competition**

In the current approach, the available budget for cohesion support per country is pre-determined at the start of each planning period. Regional governments may then come up with proposals so as to absorb the budget that was reserved for them. Thereby, the EC imposes a number of conditions. For instance, it determines broadly defined priority areas (concentration) and demands that regional governments develop a coherent medium-term program to cope with their structural problems (programming). The

principles of concentration and programming ensure an integrated approach that intends to make cohesion policy effective in stimulating regional growth.

The integrated planning approach causes two problems, however. First, it reduces the flexibility in the choice of regional projects. Local governments usually have better information and knowledge about the most effective way to encourage regional economic growth. This local strategy is not necessarily consistent with the conditions imposed by the EC. Second, the integrated approach causes rent-seeking and moral hazard. Rent-seeking means that regional governments are designing projects that meet the criteria of the EU, but which are not necessarily effective in stimulating growth. Moral hazard refers to the endogenous response by local and regional governments to the provision of EU-funds. For instance, national governments may decide to withdraw investments in lagging regions. Alternatively, local governments may use the EU funds for low-productivity projects, so as to keep their region within the eligibility criterion for cohesion support. Rent-seeking and moral hazard reduce the effectiveness of EU investments.

To avoid these problems with the planning approach, funds may alternatively be distributed on the basis of projects. In that case, all regions (or nations) in the EU may deliver project proposals for co-financing by the EU. The EC decides how the cohesion budget will be spent across the various projects, based on a number of selection criteria. The latter may include the welfare level of a region, an ex-ante project evaluation based on cost-benefit analysis, and the institutional setting in which the project will be implemented. With the project approach, governments would compete for EU funds. Policy competition will reduce rent-seeking and alleviate moral hazard. The project approach also allows for more flexibility than the integrated EU approach.

The flip side of the coin is that the coherence of the integrated approach declines. Moreover, the ranking of projects by bureaucrats of the EU can be subject to other forms of government failure, due to lobbying for instance.

### **Accountability versus simplicity**

To absorb cohesion support, regional governments have to fulfil a number of conditions with respect to their legal and administrative framework. This is seen as a necessary device to build an appropriate system of checks and balances and to avoid fraud with EU money. The EC also calls for evaluation procedures so that it can control whether EU funds are indeed spent in the way they were intended. The institutional requirements, control mechanisms, and evaluation procedures have become tougher since the last reforms at the Berlin Council in 2000 (WRR, 2001).

Accountability comes at a cost. The complex rules and regulations create substantial administrative costs for local and regional governments. This reduces the capacity of regions to absorb the funds, especially in the poorer regions. Transforming cohesion policy into a system of fiscal transfers could reduce complexity. In that case, cohesion support boils down to a net transfer from rich to poor countries, without any further involvement or control of the EC regarding the spending of this transfer.

### *The World Bank approach*

European cohesion policy has some features in common with foreign aid provided by the World Bank. In particular, the aim of both types of aid is to enhance economic growth in regions or countries that lag behind. The World Bank has recently evaluated the effectiveness of its foreign aid. Some of the main conclusions from this evaluation are (World Bank, 2001):

- Financial support works in a good policy environment with sound economic management
- The main value of projects is to strengthen institutions and policies
- Aid requires a focus on ideas, not money

Apparently, it is not money per se that contributes to growth, but the role of aid in being a catalyst for change in policies and institutions, and being a generator of ideas. Aid therefore, should not be based on a top-down approach, but should support initiatives that change the functioning of the public sector in the right direction. A well-functioning and efficient public sector with competent administrators is vital for aid to be effective.

The disadvantage of a system of fiscal transfers, however, is that the lack of accountability may cause local government failures. This seems especially problematic for less developed countries that lack an appropriate institutional framework. In this respect, we may learn lessons from the World Bank. They conclude on the basis of an evaluation of foreign aid programs that the main ingredient of effective financial support is that it is used as a catalyst for change in policy and institutions (see the Box below). In analogy to this, effective cohesion policy may require that funds are accompanied by conditions that improve the functioning of the public sector in the countries or regions that receive the funds.

### **Additionality versus absorption**

To ensure that EU funds lead to extra investments in infrastructure and human capital, rather than substitute for national investments in these areas, cohesion support requires co-funding from national governments.<sup>26</sup> The problem with this principle of additionality is that it is hard to verify in practice. EU funds therefore may still cause crowding out. Indeed, estimations in section 3.3 suggest that EU funds crowd out national support to lagging regions by 17% on average, in spite of the co-funding requirement.<sup>27</sup> As the current co-funding rates are insufficient to prevent crowding out, this may call for higher co-funding rates (SER, 1997).

For the very poor regions however, co-funding requirements may already be too demanding. Indeed, relatively poor national or local governments often lack sufficient financial means to co-finance projects or programs. Thus, high co-funding rates may prevent the absorption of funds in the very poor regions. For them, a lower co-funding rate may be necessary to stimulate growth.

There thus tends to be a trade-off in determining the co-funding requirements. On the one hand, avoiding crowding out in rich countries calls for higher co-funding rates. On

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<sup>26</sup> Co-funding also reduces the risk that EU funds are spent on projects with a very low value.

<sup>27</sup> In addition to this, there may be two other types of crowding out. First, EU funds may substitute for loans from the European Investment Bank. Second, as argued by Boldrin and Canova (2001), EU funds may reduce migration of people from poor to rich regions in the EU, which serves as an alternative mechanism to reduce regional disparities.



the other hand, ensuring sufficient absorption capacity in poor countries calls for lower co-funding rates. A way out of this dilemma is to make the co-funding rate dependent on the level of welfare; i.e. applying a low co-funding rate for poor countries and a high co-funding rate for rich countries. This would also increase the redistributive efficiency of cohesion support.

### **6.3. Options for reform in light of enlargement**

How can future cohesion policy most effectively contribute to the goal of convergence and, at the same time, prevent political conflicts on the distribution of its costs? One way to think about this question is by exploring how EU-enlargement changes the dilemmas discussed in the previous Section.

#### **How enlargement changes dilemmas**

The first dilemma is of a general nature and does not change due to enlargement: convergence is assumed to remain the primary goal of cohesion policy. Enlargement imposes new challenges because of the substantial income differentials between the CEECs and the EU. Indeed, enlargement makes it more urgent to concentrate support on poor countries or regions.

Concentration on the poorest regions, however, intensifies the second dilemma, namely that between redistributive efficiency and political feasibility. Indeed, countries have different interests with respect to the distribution of funds. Northern European countries, like the Netherlands and Germany, want to keep the overall budget for Structural Funds limited. Southern European countries, like Spain and Greece, want to maintain support for their lagging regions, for example by claiming that the 75% criterion for Objective 1 support should be raised. Finally, accession countries claim their slice of the pie by arguing, for example, that the cap on total cohesion support of 4% of GDP should be abolished as it leads to a perverse distribution of funds (see Table 6.4). The outcome of the political bargaining will probably be a compromise between these different interests. Problematic in this respect is the unanimity requirement. Indeed, if Europe is willing to improve redistributive efficiency, it has to change the unanimity requirement in cohesion policy. Otherwise, each reform can be blocked by some minority interest. The Nice treaty has, however, been unable to change the unanimity rule.

The third dilemma, between regional and national convergence, is inherently political: at what level does the EU define its objectives? As the CEECs are relatively poor almost in their entirety, EU-enlargement shifts the focus from regions to nations. In other words, convergence between the CEECs and the EU-15 (WRR, 2001) suggests a national approach. The Box below illustrates implications of such an approach. The effects for the net fiscal position of countries may, however, be problematic politically. Linking such a reform to other changes, for example to the EU revenue system, might therefore be necessary to obtain a feasible solution.

The fourth dilemma refers to planning versus competition. For the current member states, introducing policy competition may be an attractive option to increase the effectiveness of cohesion policy. Policy competition may also have some advantages for the CEECs, namely to the extent that the level of welfare is an important criterion in the distribution of funds among projects. For the CEECs, however, the integrated planning

approach may also have some distinct advantages. In particular, the planning approach ensures sufficient coherence among projects to deal with a broad range of structural problems. Moreover, the expertise of the EC might be helpful to successfully implement programs. For instance, in environment and transport, the CEECs face enormous challenges to comply with the *acquis communautaire*. These areas seem suitable to be supported by European cohesion policy.

### ***Redistribution under the national approach***

One way to improve redistributive efficiency is to concentrate support to member states with a GDP per capita below the EU average (IBO, 2001). CPB (2001) has analysed the distribution of funds under this alternative system in an enlarged EU, thereby assuming that the amount of support to a country falls linearly with its income per capita. The results are presented in the Table below. We see that in the EU-15, only Greece, Portugal and Spain would receive cohesion support. About two-thirds of the budget flow to the new member states. All new member states, with the exception of Slovenia and Cyprus, would receive the maximum support of 4% of GDP. This cap implies that accession countries with lower levels of GDP per capita receive less support than countries that are richer. This reduces redistributive efficiency. Alternative formulae regarding the support per member state, or eliminating the cap on the maximum support per country could alleviate this perverse distributional effect of cohesion support. CPB (2001) explores a number of these alternative scenarios.

*Table 6.4. Distribution of cohesion support in an alternative scenario (prices 1999)<sup>a</sup>*

	<i>In bln euro</i>	<i>1000 euro per capita</i>	<i>In % cohesion</i>	<i>In % GDP budget</i>
Spain	24	0.6	11.8	0.4
Portugal	17	1.7	8.6	1.7
Greece	33	3.1	16.6	2.9
Czech Republic	18	1.8	9.2	4.0
Hungary	17	1.7	8.4	4.0
Poland	54	1.4	26.8	4.0
Slovak Republic	7	1.3	3.4	4.0
Slovenia	6	2.9	2.9	3.4
Estonia	2	1.3	0.9	4.0
Latvia	2	0.9	1.1	4.0
Lithuania	4	1.0	1.8	4.0
Cyprus	1	1.3	0.5	1.4
Bulgaria	4	0.5	2.1	4.0
Romania	12	0.5	5.9	4.0
Total	200		100.0	
- of which accession countries	126		63.0	

<sup>a</sup> Only member states with a GDP per capita below the EU average are eligible for support. The amount of support falls linearly with GDP per capita. The budget is fixed at €200 billion and the maximum support to countries is capped at 4% of its GDP. In the calculations, the relative welfare levels of 1999 have been taken as given.

<sup>b</sup> The results for Cyprus depend on the question whether the Turkish part is included or not (here we assume it is not).

Source: CPB (2001).

With respect to the fifth dilemma, enlargement tends to call for less complex rules, regulations and evaluation procedures, even if it comes at the expense of accountability. In particular, the administrative requirements may seriously hamper the absorption of Structural Funds by the CEECs. In addition, the investments necessary to meet the institutional requirements imposed by the EC could alternatively be used in a more productive way.<sup>28</sup> Nevertheless, it may be undesirable to eliminate all conditions imposed on cohesion support. Indeed, according to the World Bank experience, appropriate conditions on financial support could help to make cohesion support effective in stimulating growth. These conditions should focus on good policy and an appropriate institutional environment in which policies are implemented. Thus, cohesion support could act as a catalyst for institutional and policy change in the CEECs.

With respect to the final dilemma, between additionality and absorption, enlargement tends to call for lower co-funding rates for the poorest member states. Indeed, lower co-funding would raise the absorption capacity of the CEECs, which is a necessary condition for cohesion support to be effective.

### **Options for reform**

Changes in the various dilemmas tentatively suggest three possible directions for reform. These aim to increase the effectiveness of cohesion support in terms of convergence by reducing government failures and, at the same time, take account of political constraints. Perhaps these latter constraints can be relaxed if the effectiveness of cohesion support indeed increases: more ambitious objectives could then be obtained with smaller budgets.

### **Control**

The first option keeps the institutional structure more or less unchanged. It aims to reduce inefficiencies through a more active involvement of the EC in the implementation of cohesion policy, by more intensive monitoring, better evaluations and tighter rules and regulations. Thus, crowding out and rent-seeking are to be reduced.

This option reflects the typical response of the EU on past criticism on cohesion policy. It is doubtful, however, whether it will indeed succeed in increasing its effectiveness. In particular, by imposing tighter rules and administrative procedures, it may actually increase administrative costs of both regional and national governments and of the EU. Furthermore, it may further reduce the absorption capacity in a number of countries, primarily the CEECs.

### **Competition**

The second option alleviates government failures through competition among governments. In particular, funds are no longer allocated ex-ante on the basis of political bargaining as is currently the case. Instead, the European Council determines only the total budget for cohesion support for a particular planning period.

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<sup>28</sup> The EU currently supports these investments through pre-accession support. After enlargement, further investments are probably required to increase the absorption capacity of the CEECs.

Subsequently, national or regional governments can apply for these funds on the basis of project proposals. The EC is responsible for the assessment of these proposals on the basis of a number of objective criteria. These may include the welfare level of a region or country, the expected return to the investment, cross-border spillover effects, and whether a project fits in a coherent program. As governments compete for funds under this option, they have an incentive to develop proposals with a high rate of return. Accordingly, this option reduces government failures associated with moral hazard and rent-seeking. Moreover, co-funding requirements in should be made dependent on the level of welfare in a country. This improves distributional efficiency of cohesion support, reduces crowding out in rich nations and increases the absorption capacity in the new member states.

The EC has an important task in the allocation of funds and the evaluation of projects. This raises two potential problems. First, the assessment by the EC may be vulnerable for lobbying by pressure groups or national politicians. Second, the requirements imposed by the EC may involve high administrative costs for governments that apply for funds; therefore, an important challenge is to design assessment procedures that preempt these problems.

### **Flexibility**

The third option alleviates government failure by minimising bureaucracy. In particular, it reforms cohesion policy into a system of fiscal transfers at the country level. Thus, the European Council decides each planning period about the allocation of funds on the basis of political priorities. If the EU takes its redistributive objective serious, the Council will concentrate support on the poorest member states. A system of fiscal transfers at the national level would minimise administrative costs, alleviate crowding out and avoid rent-seeking and moral hazard. In other words, government failures would be minimised. Moreover, this option is consistent with the principle of subsidiarity in that it acknowledges that decentralised governments know best how to spend cohesion support in a productive way. Also, the lack of absorption capacity in poor member states would no longer pose a problem.

A possible problem with this option is that it is vulnerable for local government failures, especially in countries that lack an effective and transparent public administration; therefore, it may not be wise to remove all conditions associated with European fiscal transfers. The World Bank experience teaches us that an important value of financial support lies in its impact on institutions and policies. Hence, if financial support is accompanied by conditions regarding institutional reform and sound economic policies, this may increase its effectiveness in stimulating convergence. Although this experience is based on developing countries, it may also hold for some European countries and in particular for the accession countries. Indeed, in the CEECs there is room for substantial improvement in the implementation of law, the quality of public administration, or the financial system, which are vital for economic growth.

### **6.4. Conclusions**

EU enlargement imposes new challenges on cohesion policy, both with respect to the fiscal implications and regarding convergence. This chapter discusses directions for reform in European cohesion policy that aim to increase the effectiveness in terms of

convergence. As Chapter 5 concludes, there is ample room for such improvement, for instance if reforms succeed in reducing crowding out, moral hazard and rent-seeking. Reforms however should also take account of political constraints. If effectiveness is increased, then the same goals can be achieved with fewer funds. This relaxes tensions between net contributors and net receivers of cohesion support. Three tentative suggestions for reform are put forward. The option 'control' is a further tightening of procedures and monitoring by the EC. It runs the risk of exacerbating existing government failures. An alternative direction is to move towards a system in which local governments compete for funds on the basis of project proposals. The option 'competition' is to make the amount of support by the EU for a project dependent on national welfare so as to concentrate support to poorer countries. Finally, the option 'flexibility' is to move towards a system of fiscal transfers on a national basis, which is accompanied by conditions regarding institutional and policy reform. The last two options seem promising ways to increase the effectiveness of cohesion policy in the future.

## CHAPTER 7

### CONCLUSIONS

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The forthcoming enlargement of the European Union stretches cohesion policy. GDP per capita in the Central and Eastern European Countries is currently about one-third of the present EU average. Since cohesion policy aims at reducing the welfare differences among her regions, enlargement will involve a net transfer of funds towards the candidate countries. This will occur through an expansion of the EU budget, a reallocation of existing funds towards the new member states, or both. The question that dominates the current debate about cohesion policy is: Who will pay for the cohesion support to the new member states? Southern EU countries firmly argue that they want to maintain cohesion support for their lagging regions in the future, whereas northern EU countries argue that they want to keep the overall budget limited. This political game spells conflict for the negotiation round in 2006, when the allocation of funds for the new planning period 2007-13 will be decided upon.

Can these political tensions be relaxed? Although the net fiscal position with respect to EU cohesion policy tends to dominate the political debate in Europe, it is important to keep in mind the primary objective of cohesion policy: convergence of welfare levels in Europe. This raises a number of questions. For instance, how effective is current cohesion policy in reducing regional income disparities? And is there scope for improvement? If that is the case, then the same degree of convergence could be achieved with fewer funds, or more with the same budget.

This study reveals that, during the past decades, poorer regions in the EU have indeed caught up with the richer regions. In particular, the welfare levels between both EU member states and regions within the majority of member states have converged. To what extent is this due to cohesion policy? Economic theory suggests that cohesion support can indeed be part of the explanation. Various model simulations show for example that, if funds are properly spent on public investment projects, cohesion support can be a powerful instrument to stimulate growth in lagging regions. The evidence from econometric studies however, is at best mixed. Studies variously report positive, insignificant or even negative effects of cohesion support on growth. Our own econometric analysis confirms the ambiguity: the growth elasticity of cohesion support (measured in % GDP) varies somewhere between -0.35 and +0.7, depending on the specification.

A meta-analysis in our study confirms the substantial difference between model simulations and econometric studies. Indeed, while the growth elasticity of econometric studies does not significantly differ from zero, the elasticity from model simulations is significantly higher with a coefficient of 0.14. This implies that inefficiencies such as rent-seeking and crowding out of national regional aid retard annual economic growth in recipient regions by 0.14 percentage points per unit of cohesion support. For the EU this has negligible growth repercussions. Nevertheless, Objective 1 regions, which often receive cohesion support equal to several percentage points of their GDP, could perhaps have grown half a percentage point faster annually, had cohesion support been spent efficiently.

A number of factors could explain the difference between the potential and the actual growth impact of cohesion policy. First, a large part of cohesion support flows to relatively rich regions. Second, there may be crowding out of national regional aid by European cohesion support. Indeed, despite the co-funding requirements imposed by the European Commission, our analysis suggests that this is an important phenomenon. By way of illustration, the study finds that, on average, a region forgoes €0.17 of national regional aid for each €1 cohesion support by the EU. A third reason for the under-performance of cohesion support may be rent-seeking and moral hazard. Regional and national authorities may deliberately use funds for relatively low-productive projects. Case studies provide evidence that indeed point to rent-seeking and moral hazard. A fourth reason why cohesion support is less effective than it could potentially be, is that it replaces alternative convergence mechanisms. For instance, cohesion support to lagging regions may reduce the mobility of labour. Alternatively, cohesion support may crowd out private investment if it is spent on projects that are close substitutes for private capital.

The scope for improvement in cohesion policy poses challenges for European policy-makers. This study responds by focusing on a number of dilemmas that policy-makers face when thinking about reform, as well as discussing how EU-enlargement may change these dilemmas. It tentatively suggests three options for reform. One is to strengthen monitoring and control by the EC. Another is to move towards a system in which regional governments compete for funds on the basis of project proposals. The amount of support by the EU for a project could be made dependent on national welfare so as to concentrate support on poorer countries. A final option is to move towards a system of fiscal transfers from rich to poor countries. This should be accompanied by conditions regarding institutional reform, especially in the new member states. All three options seek to increase the effectiveness of cohesion policy by reducing government failures such as crowding out, rent-seeking and moral hazard. Furthermore, all three options aim at concentrating support on poor member states and help lagging regions to converge faster. A more effective cohesion policy allows more ambitious objectives with fewer funds. This eases the political tensions associated with future cohesion policy.

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## ANNEX I

### THE OLD SET OF SIX OBJECTIVES

---

Cohesion support is given according to three objectives, as discussed in Chapter 2. They replace six previous objectives. This Appendix presents the latter. For present policy making they are irrelevant. For the interpretation of the empirical research of this study they are, nevertheless, of some importance as the distribution of cohesion support on which most of the empirical analyses are based date back to planning periods in which these six objectives were operational. They are:

- Objective 1 funding was for regions where development is lagging behind. NUTS II regions with a GDP per capita in PPP of less than 75% of the EU average was eligible.
- Objective 2 was for restructuring the economy in areas affected by industrial decline. NUTS III regions with unemployment above EU average, more industrial employment than EU average and a fall in industrial employment was eligible.
- Objective 3 funding was for alleviating long-term and youth unemployment. The allocation was not regional, but ‘thematic’ which implied that in principle projects in any regions were eligible.
- Objective 4 funding was for the adaptation of workers to industrial change. Just as objective 3 funding this type of funding was not regional but thematic.
- Objective 5a funding was for structural adjustment in agriculture and fisheries. Again this type of funding was thematic.
- Objective 5b funding was for structural development in rural areas. Relatively ‘poor’ rural areas with a large share of agricultural employment, a low level of agricultural employment, and a declining population were eligible.
- Objective 6 funding was the for structural development in sparsely-populated areas. NUTS II regions with a population density of at most 8 persons / km<sup>2</sup> were eligible.

Objective 1 and other objectives were mutually exclusive. People in a region receive either support under Objective I or under other objectives or receive nothing at all. Objective 6 was introduced with the accession of Finland, Sweden and Austria.

## ANNEX II

### A THEORETICAL FOUNDATION FOR THE GROWTH-INITIAL LEVEL REGRESSION EQUATION

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The growth-initial level regression equation that underlies the empirical analyses of this study can be derived from the Solow growth model. This does not imply, however, that the Solow growth model is to be considered superior to alternative growth theories. Rather, the derivation exercise serves the purpose of showing that the regression equation is not ad hoc, but has at least one solid theoretical foundation.

#### **Adding cohesion support to the Solow growth model**

The first step is to build on Barro's (1990) idea of introducing productive public capital,  $P$ , in the production function:

$$Y = (K^\alpha (AL)^{1-\alpha})^\gamma P^{1-\gamma}$$

where  $Y$  denotes production,  $K$  the capital stock,  $L$  employment,  $A$  the state of the technology, and where  $\alpha$ ,  $\beta$ , and  $\gamma$  are technological parameters that determine the decreasing returns to scale with respect to either variable.

A regional government finances investment in public capital by raising tax revenue,  $\tau Y$ , where  $\tau$  denotes the statutory tax rate. It may, however, receive (a continuous stream of) cohesion support,  $xY$ . It can be to two uses: first, it can finance additional public investment; second, it can lower the tax rate. The European Commission promotes that regional governments finance additional public investment by requiring co-funding of investment projects earmarked by the structural funds program. Thus, the stream of structural funds,  $xY$ , is multiplied by a factor,  $\sigma$ , where the co-funding rate,  $\sigma - 1$ , denotes the proportion that the regional government adds to the structural funds. It is conceivable however that regional governments finance the co-funding by scrapping investment that would have taken place anyhow. Let  $\eta$  denote the proportion of the co-funding that is such financed. This crowding out of public investment boils down to a tacit reduction of the tax rate with  $\eta(\sigma - 1)$  since the effective tax rate burden rate  $\tau'(x)$  becomes  $\tau - \eta(\sigma - 1)$ . In short, the net investment in public capital equals

$$\dot{P} = (\tau'(x) + \sigma x)Y - \delta P$$

where  $\delta$  denotes the depreciation rate of capital.

The behaviour of the private economy is the same as in the standard Solow growth model. One must, however, have to take taxation into account. Thus, net investment in private capital equals

$$\dot{K} = s(1 - \tau'(x))Y - \delta K$$

The labour force and technology grow exogenously according to

$$\dot{L} = nL$$

$$\dot{A} = gA$$

Lower case symbols for output,  $y$ , private capital,  $k$ , and public capital,  $p$ , denote these variables in units of effective labour,  $AL$ . The fundamental differential equations, that describe how the economy evolves over time, are then

$$\hat{k} = s(1 - \tau'(x))k^{\alpha\gamma-1}p^{1-\gamma} - \nu$$

$$\hat{p} = (\tau'(x) + \sigma x)k^{\alpha\gamma}p^{-\gamma} - \nu$$

where  $\hat{k}$  and  $\hat{p}$  denote  $\frac{\dot{k}}{k}$  and  $\frac{\dot{p}}{p}$ , and where  $\nu$  is a shorthand for  $n + g + \delta$ .

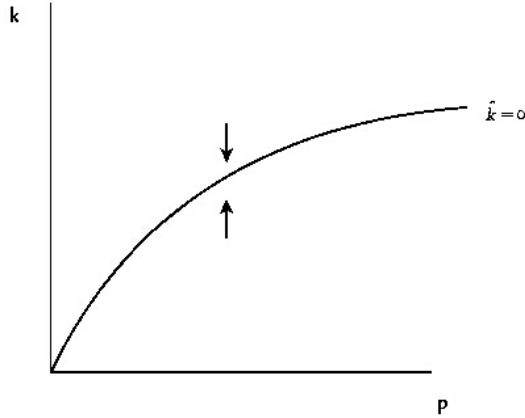
On the locus of  $\hat{k} = 0$  the ratio of private capital and effective labour is constant. Solving for  $k$  yields

$$k = \left( \frac{s(1 - \tau'(x))}{\nu} \right)^{\frac{1}{1-\alpha\gamma}} p^{\frac{1-\gamma}{1-\alpha\gamma}}$$

Since  $0 < \frac{1-\gamma}{1-\alpha\gamma} < 1$  holds true, this is a decreasing function of  $p$ . It is easy to see that

$\hat{k} < 0$  above this function, and  $\hat{k} > 0$  below it. Figure A.1 sketches the corresponding direction field in the phase plane.

Figure A.1. A constant stock of physical capital



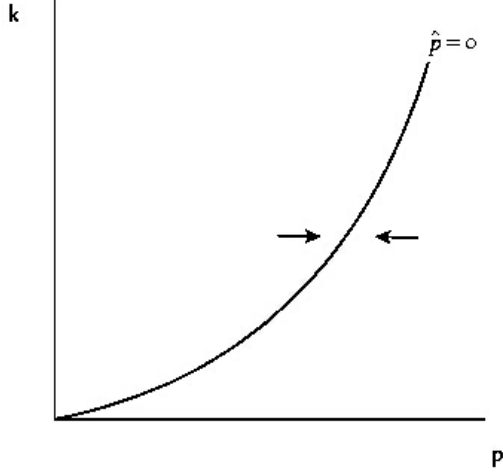
Similarly, on the locus of  $\hat{p} = 0$  the ratio of public capital and effective labour is constant. Solving for  $k$  yields

$$k = \left( \frac{\tau'(x) + \sigma x}{\nu} \right)^{\alpha\gamma} p^{\frac{1}{\alpha}}$$



Since  $\frac{1}{\alpha} > 1$  holds true, this is an increasing function of  $p$ . It is easy to see that  $\hat{p} > 0$  to the left of this function, and  $\hat{p} < 0$  to the right of it. Figure A.2 sketches the corresponding direction field in the phase plane.

Figure A.2. A constant stock of public capital



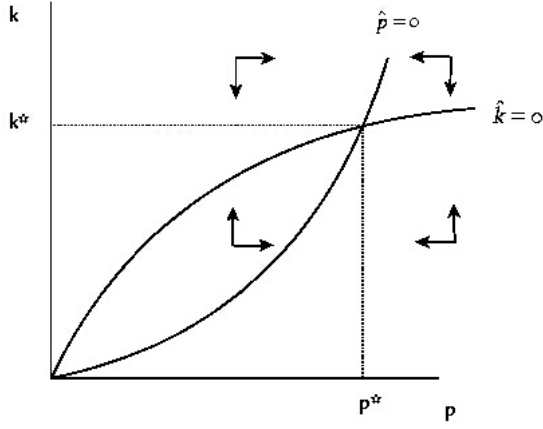
At the intersection of the loci of  $\hat{k} = 0$  and  $\hat{p} = 0$  the economy is in its steady state, in which no variable changes in terms of effective labour units. Solving for the steady state yields

$$k^* = \left( \frac{s(1 - \tau'(x))}{\nu} \right)^{\frac{1}{1-\alpha}} \left( \frac{\tau'(x) + \sigma x}{\nu} \right)^{\frac{1-\gamma}{\gamma(1-\alpha)}}$$

$$p^* = \left( \frac{\tau'(x) + \sigma x}{\nu} \right)^{\frac{1-\alpha\gamma}{\gamma(1-\alpha)}} \left( \frac{s(1 - \tau'(x))}{\nu} \right)^{\frac{\alpha}{1-\alpha}}$$

Figure A.3 (on the next page) sketches the corresponding direction field. It reveals that the steady state is a stable equilibrium.

Figure A.3. A stable steady state



Output per unit of unit of effective labour equals

$$y^* = \left( \frac{\tau'(x) + \sigma x}{\nu} \right)^{\frac{1-\gamma}{\gamma(1-\alpha)}} \left( \frac{s(1-\tau'(x))}{\nu} \right)^{\frac{\alpha}{1-\alpha}}$$

Each term on the right hand side resembles the steady state of the original Solow model: the first term corresponds, however, to public, and the second to private capital accumulation. It is apparent that, as long as  $\eta > 1$ , structural funds raise the steady state level of output per unit of effective labour. In other words, as long as crowding out of public investment is not out of proportion, structural funds have a permanent impact upon the economy.

### The regression equation

From the phase diagram in Figure A.3 it is clear that the dynamics drive the economy towards its steady state. We need, however, to describe the dynamics more precisely. In particular, we need to find an explicit expression relating the growth of production per capita to initial production per capita, the growth-initial level equation. A first step towards this goal is to linearise the fundamental differential equations for  $\hat{p}$  and  $\hat{k}$ . This yields:

$$\begin{aligned} \tilde{p} \bullet &= \nu [\alpha \gamma \tilde{k} - \gamma \tilde{p}] \\ \tilde{k} \bullet &= \nu [(1-\gamma) \tilde{p} - (1-\alpha\gamma) \tilde{k}] \end{aligned}$$

where  $\tilde{p} \bullet$  and  $\tilde{k} \bullet$  denote  $d\hat{p}$  and  $d\hat{k}$ , and  $\tilde{p}$  and  $\tilde{k}$  denote  $\frac{dp}{p}$  and  $\frac{dk}{k}$ . Changes are

relative to the steady state since  $\nu$  is substituted for  $s(1-\tau(x))k^{\alpha\gamma-1}p^{1-\gamma}$ . This implies that the equations above linearly approximate the dynamics in the neighbourhood of the steady state.

Linearising the production function, and differentiating with respect to time yields

$$\tilde{y} \bullet = \alpha \tilde{k} \bullet + (1 - \gamma) \tilde{p} \bullet$$

where  $\tilde{y} \bullet$  denotes  $d\hat{y}$ , and  $\hat{y}$  denotes  $\frac{\dot{y}}{y}$ . Substitution of the expressions for  $\tilde{p} \bullet$  and  $\tilde{k} \bullet$  gives

$$\tilde{y} \bullet = -\lambda \tilde{y}$$

where  $\lambda$  denotes  $(1 - \alpha)\gamma\nu$ . By integrating the left and the right hand sides we obtain:

$$\hat{y} = \lambda [\ln y^* - \ln y]$$

This equation is akin to the ‘growth-initial level’ equation. It says that the growth rate of income (in terms of effective labour) is directly proportional to the gap between (the logs of) its steady state and present level. The parameter  $\lambda$  measures the speed by which the economy converges to the steady state. Since  $\lambda$  does not contain  $x$  this speed is independent of cohesion support. Nevertheless, growth itself is still accelerated since  $y^*$  increases in  $x$ .

Integration with respect to time yields:

$$\ln y_{t_1} - \ln y_{t_0} = \lambda' \ln y^* - \lambda' \ln y_{t_0}$$

where  $\lambda'$  denotes  $1 - e^{-\lambda T}$ , and  $T$  denotes  $t_1 - t_0$ . In order to get from income per unit of effective labour to income per head, substitute:

$$\ln y_t = \ln \bar{y}_t - \ln A_{t_0} - gt$$

where  $\bar{y}$  denotes  $\frac{y}{L}$ . The equation then becomes:

$$\ln \bar{y}_{t_1} - \ln \bar{y}_{t_0} = \lambda' \ln A_{t_0} + g(t_1 - (\lambda' - 1)t_0) - \lambda' \ln \bar{y}_{t_0} + \lambda' \ln y^*$$

It says that the growth of production per capita,  $\ln \bar{y}_{t_1} - \ln \bar{y}_{t_0}$ , is a linear function of initial production per capita  $\bar{y}_{t_0}$ , and the steady state, which in its turn is a function of cohesion support. The terms  $\lambda' \ln A_{t_0} + g(t_1 - (\lambda' - 1)t_0)$  constitute a constant determined by population growth, the initial state of technology, technological progress, depreciation of the capital stock, and the chosen lag between the initial period and the present.

This equation corresponds closely to the regression equation from Chapter 4

$$\tilde{y}_i = \beta_1 + \beta_2 \ln y_{i-1} + \beta_3 cs_i + \beta_4 D$$

where the region index  $i$  and the error term  $\varepsilon$  are suppressed to avoid notational clutter. Since  $\tilde{y}_i = \ln \overline{y_{i1}} - \ln \overline{y_{i0}}$  after appropriately renaming the variables and indices, and since fixed effect  $\beta_1 + \beta_4 D$  is the constant  $\lambda' \ln A_{i0} + g(t_1 - (\lambda' - 1)t_0)$ , the only difference between both equations is that cohesion support, in conjunction with crowding out, do not necessarily enter linearly via the steady state level of income per unit of effective labour in theoretical equation, and linearly in the regression equation. Thus, apart from the additional assumption that the impact of cohesion support can be approximated linearly, the regression equation follows directly from the Solow growth model. This provides a strong theoretical foundation for the empirical analyses of this study.

## **EXPLANATION OF ABBREVIATIONS**

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CEECs	Central and Eastern European Countries
CI	Community Initiatives
CS	Cohesion Support
DG	Directorate General of the European Commission
EC	European Commission
EAGGF	European Agricultural Guidance and Guarantee Fund
EMU	European Monetary Union
ERDF	European Regional Development Fund
ESA	European System of Accounting
ESF	European Social Fund
EU	European Union
FIFG	Financial Instrument for Fisheries Guidance
GDP	Gross Domestic Product
ISPA	Instrument for Structural Policies for Pre-accession
NUTS	Nomenclature des Unité Territoriales Statistiques
PHARE	Poland Hungary Action for the Reconstruction of the Economy
PPP	Purchasing Power Parities
R&D	Research and Development
SAPARD	Special Accession Program for Agriculture and Rural Development
SINCOM	Commission accounting system
SRESC	Second Report on Economic and Social Cohesion

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FPB	Belgian Federal Planning Bureau, Brussels, Belgium
IE-BAS	Institute of Economics, Bulgarian Academy of Sciences, Sofia, Bulgaria
IE-LAS	Institute of Economics, Latvian Academy of Sciences, Riga, Latvia
IER	Institute for Economic Research, Ljubljana, Slovenia
IHS	Institute for Advanced Studies, Vienna, Austria
ISAE	Istituto di Studi e Analisi Economica, Rome, Italy
ISCTE	Instituto Superior de Ciências do Trabalho e da Empresa, Lisbon, Portugal
ISWE-SAS	Institute for Slovak and World Economy, Bratislava, Slovakia
NEI	New Economy Institute, Vilnius, Lithuania
NIER	National Institute of Economic Research, Stockholm, Sweden
NIESR	National Institute for Economic and Social Research, London, UK
NOBE	Niezalezny Ośrodek Bada Ekonomicznych, Lodz, Poland
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